



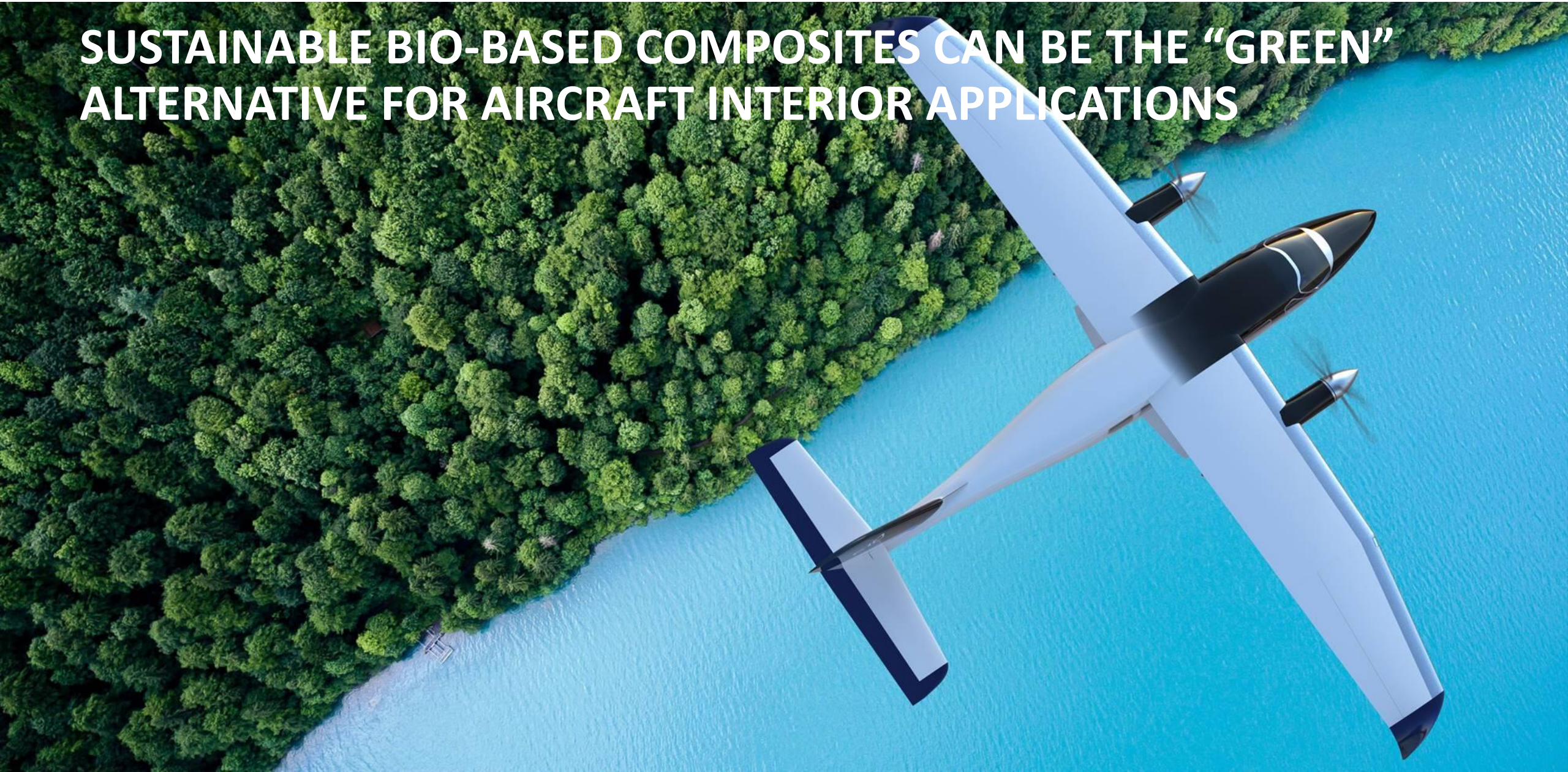
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SUSTAINABLE BIO-BASED COMPOSITES FOR AIRCRAFT COMPONENTS

EADCO GmbH

Rosario De Luca

SUSTAINABLE BIO-BASED COMPOSITES CAN BE THE “GREEN” ALTERNATIVE FOR AIRCRAFT INTERIOR APPLICATIONS



AIRCRAFT TECHNOLOGY DEMONSTRATOR AND PROTOTYPE - SCOPE

One of the scope of the project was to evaluate if Aircraft Interior Parts with structural purpose made of bio-based materials (natural fibers reinforcement) could compete with a corresponding part made of traditional Carbon Fiber Composite sandwich structure in terms of:

- ✓ Stiffness
- ✓ Low Weight
- ✓ Fire performance
- ✓ Costs
- ✓ Manufacturing Processes and Time-Consuming
- ✓ Attractive Appearance
- ✓ Recyclability

The challenge was also to fit with the best weight-strength ratio: Carbon Fiber-reinforced components impress with their high static and dynamic load capacity - despite their low weight.

AIRCRAFT TECHNOLOGY DEMONSTRATOR AND PROTOTYPE - APPLICATIONS

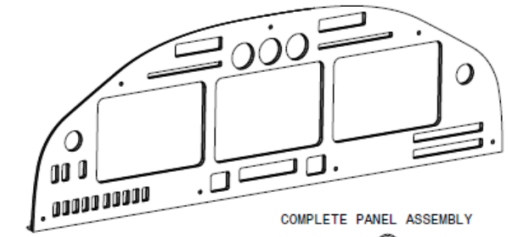
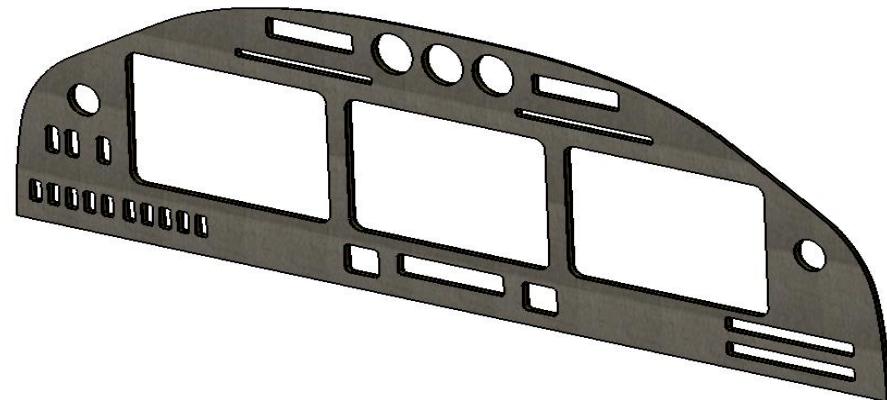
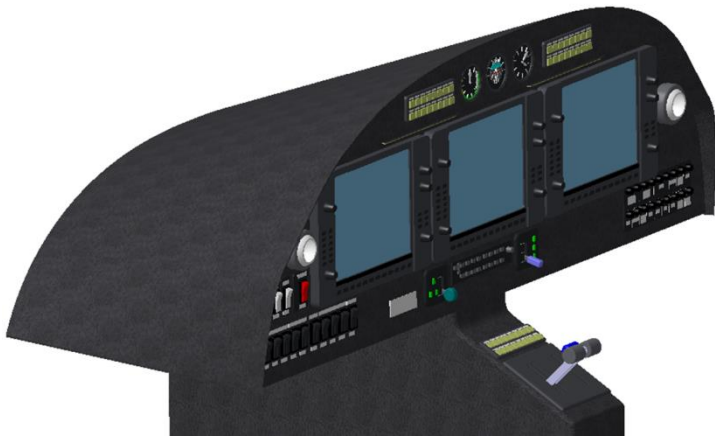
Two applications of Bio-based Composites for aircraft interior have been evaluated:

- Interiors Sidewall Panel (no structural purpose)
- Cockpit Dashboard (with structural purpose)

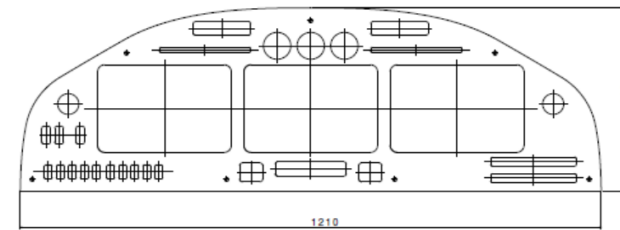
As Demonstrator and Prototype the first worldwide Cockpit Dashboard was designed using bio-based materials and natural fibers reinforcement taking in account the requirements mostly related with the material fire resistance EASA CS-25.853 and the Emergency Landing Conditions EASA CS 23.561.

APPLICATION EXAMPLE FOR AIRCRAFT COMPONENTS MADE OF FLAX-PREG OR HEMP-SATIN

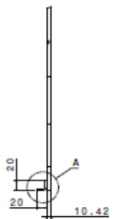
Cockpit Dashboard



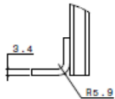
COMPLETE PANEL ASSEMBLY
ITEM 6
Isometric view
NOT TO SCALE



View Looking Fwd
Scale: 1:2



Left view
Scale: 1:2

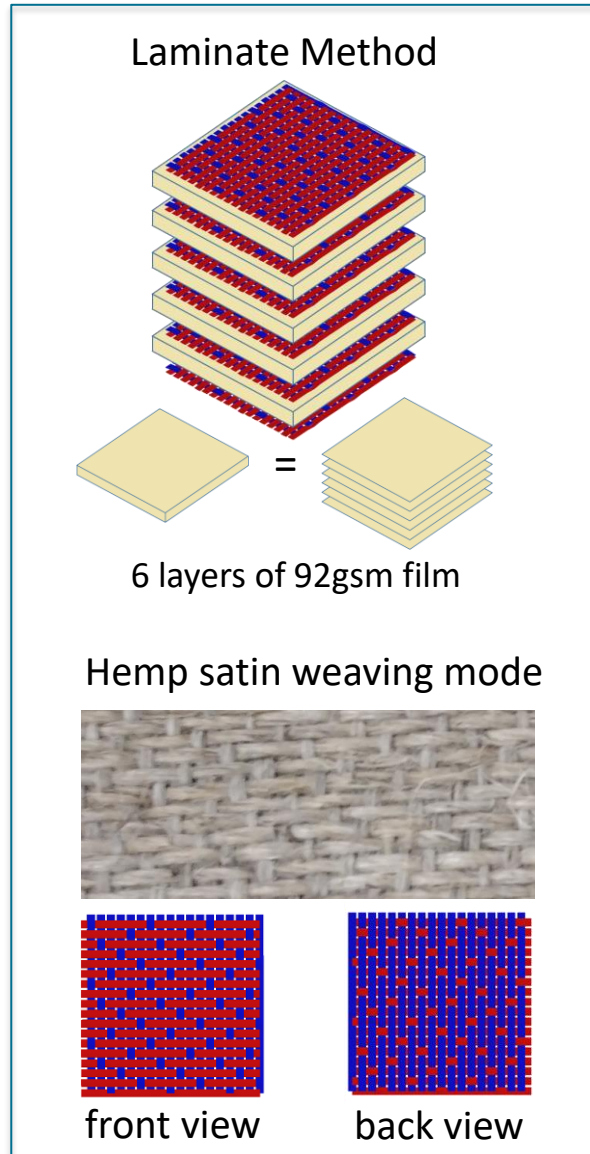


Detail A
Scale: 2:1



30.42
REF

HEMP DASHBOARD FABRICATION



Hemp skin

Foam core
(Divinycell F40)

Foam core
(Divinycell F130)

Hemp skin



Thin polymer film (SR1124 resin + SD4775-1 hardener) is applied on the laminates and foam by a wool painting roller.



Completed dashboard

AIRCRAFT TECHNOLOGY DEMONSTRATOR AND PROTOTYPE – TESTS

During the SSUCHY Dashboard development activities, several Tests have been performed with very good results: Static, Vibration and Modal Analysis



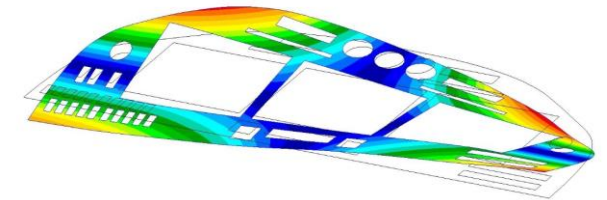
(UFC) - Xavier GABRION, Vincent PLACET



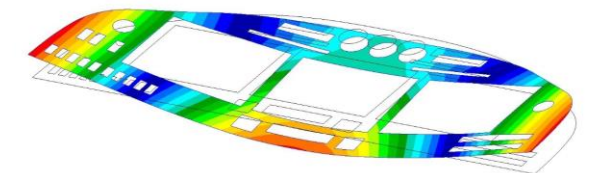
(UFC/ENSMM) - Pauline BUTAUD, Morvan OUISSE



Delorm: SOL103.SC1, Mode 7.Freq=22.531, Eigenvectors, Translational.



Delorm: SOL103.SC1, Mode 8.Freq=29.377, Eigenvectors, Translational.



(EADCO) – Giuseppe MAGGIAN

AIRCRAFT TECHNOLOGY DEMONSTRATOR AND PROTOTYPE – CHALLENGE: THE EASA CS-25.853 - TESTS

Materials for Aircraft Interiors must be validated through fire performance tests according to the Appendix F - Test Procedure for Self-Extinguishing Materials in accordance with EASA CS-25.853:

- ✓ Flammability
- ✓ Heat release rate test
- ✓ Smoke density
- ✓ Smoke toxicity

Flammability requirements are based on the following tests (CS-25 Appendix F):

- ✓ 25.853 Part I Test Criteria and Procedures for Showing Compliance with Sec. 25.853
- ✓ 25.853 Part IV Test Method to Determine the Heat Release Rate From Cabin Materials Exposed to Radiant Heat
- ✓ 25.853 Part V Test Method to Determine the Smoke Emission Characteristics of Cabin Materials


ACTIVITIES IN PROGRESS

- Production of the Hemp Fabric Cockpit Dashboard
- Production of a new set of specimen
- Additional Tests planned

NEXT STEPS

- Final manufactured Hemp Fabric Cockpit Dashboard planned to be delivered end of February
- Progressing with all the required tests to qualify the material for Aircraft Interiors usage



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Bio-based Industries
Consortium



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for Research & Innovation

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