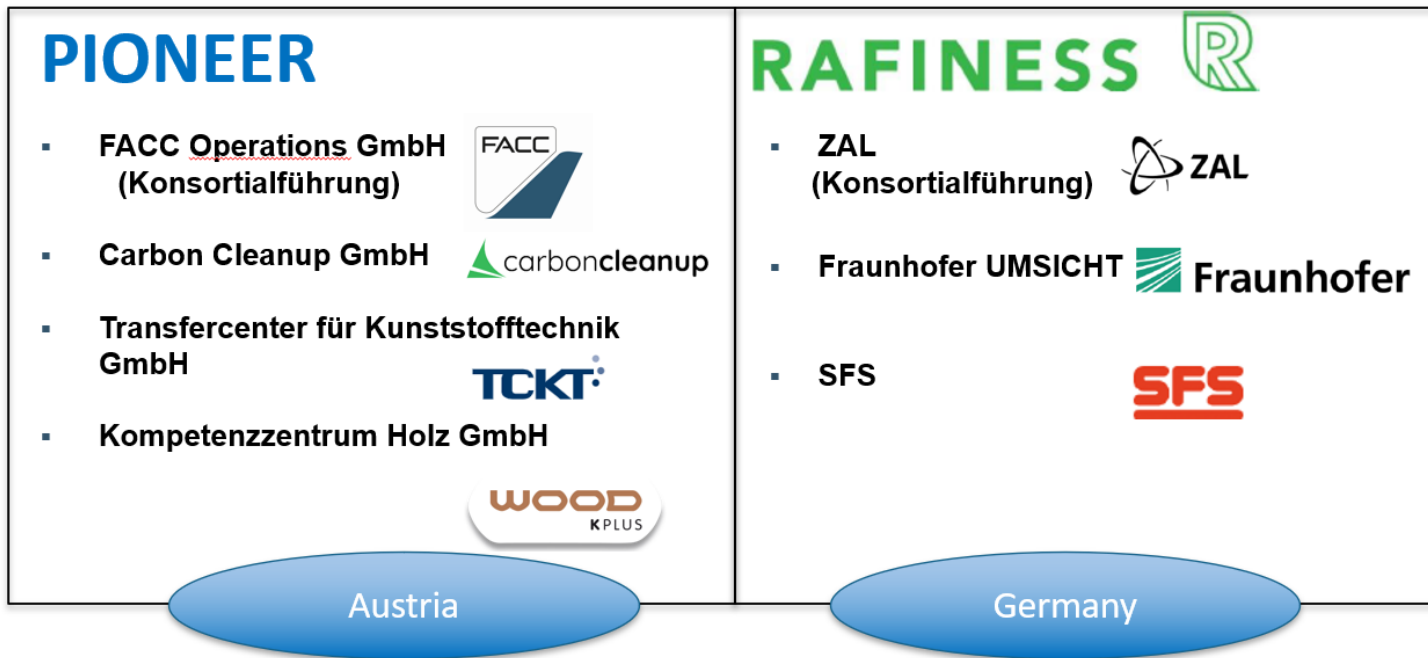


PIONEER

D.I. mont. Bernhard Graf
FACC
Ried im Innkreis

Brief description of the consortium partners

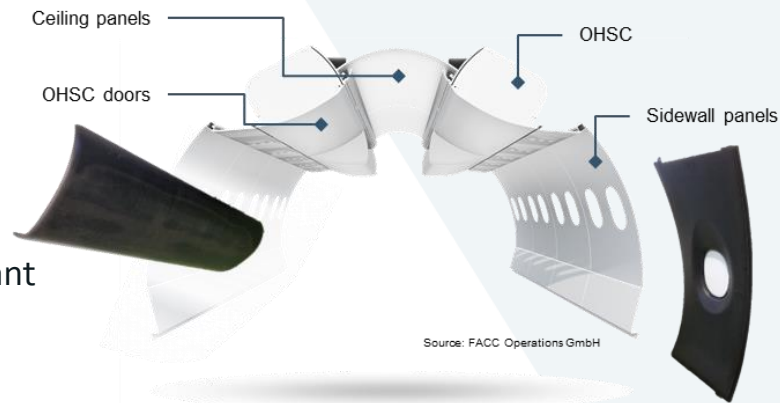


Aim of the project / Background of the project

- Investigation for alternative Reach compliant Prepregs for Interior Applications (FACC)
- Concept Studies Overhead Bins (FACC)
- Functional Integration (RAFINESS Project mainly with german Partners)
- Process Control via DEA (with Wood K Plus)
- Recycling of Prepreg-Residues from FACC (with CCU & TCKT)
- Life Cycle Assesment (LCA) (FACC)

Project results: Prepregs for Interior Applications

- Target: Implementation for Interior components
 - price competitive
 - and “reach compliant” Prepregs
 - incl. FST properties
- Currently used Phenolic Prepreg is not Reach Compliant
 - (not hazard free and carcinogenic)
- 2 Basic Approaches & Results
 - Biobased Furan Prepreg => fully tested incl. FST
 - Epoxy Prepreg => fully tested incl. FST



Project results: New Overhead Bins "Pioneer – Alpha"

Target: Less Weight - More Volume – Innovative Arrangements

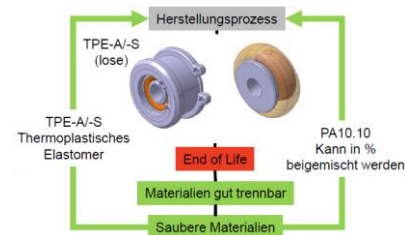
- Different Concepts developed
- Mock up build with new materials
- Including new Hinge and Latch Designs
- Ventilation systems



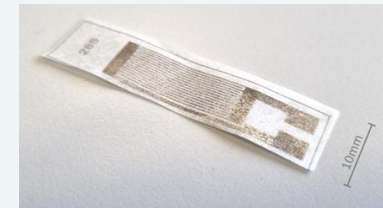
Project results: Functional Integration

Target: verify 3D printing for Aerospace Interiors

- Bin Mock Up with Sandwich Panels and 3 D Printed Edge Connections (ZAL)
- 3 D Printed Circuits on Bin Surfaces (Fraunhofer IFAM)
- Recyclable Shockmounts (SFS)

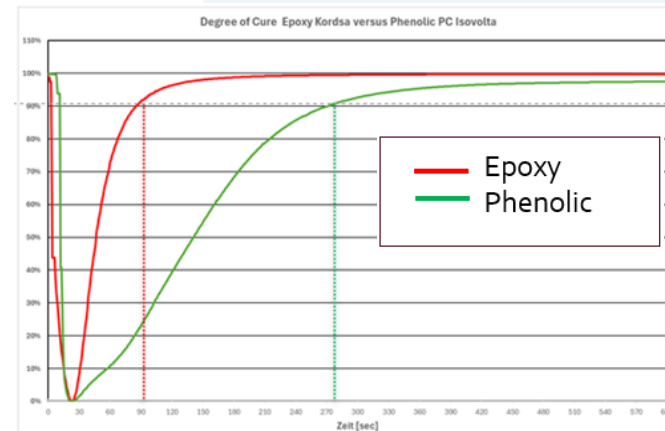


Project results: Process Control via DEA



Target: Measure the effective Cure cycle times for Prepregs using DEA and Paper Sensors

- IN SITU Measurement of the Curing
 - Time of the lowest viscosity during the cure
 - And time to reach a sufficient degree of cure
- Target/Benefits:
 - Reduce cure cycles
 - Or reduce temperature to reduce cost



Project results: Prepreg Recycling

Target: Recycle Prepreg Waste from FACC to new compounds

- Automated waste classification of CF-Epoxy prepreg waste plus Poly Films
- Waste shredding for recovery of contained CF's as short fibers
- rCF processing for Compounding and later 3D Printing and Injection Molding (Engel) but with huge variations



prepreg with poly film



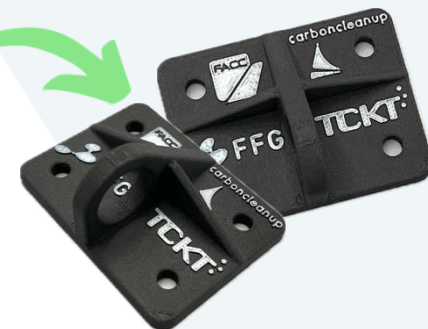
automated material
detection



material processing



processed carbon fibers



FDM 3D printed hinge



injection molded part



Project results: Life Cycle Assessment (LCA)

Target: Development of a first Concept to analyse the LCA of an Overhead BIN

- First results based on Excel and SAP data available
- CO₂eq/kg of basic materials are based on datasets like GABI-Sphera
- Materials are evaluated according to their mass and their basic composition
- Processes are evaluated according to process duration in minutes
- Full evaluation critical due to high number of Materials (app. 600.000) and processes => 2×10^8 Datasets
- Results have been calculated in EFV for material and process
- Fully automated not implemented yet
- Data for first Assessments possible (i.e. CDR....)
- Final software decision open

Utilization of the project

- Prepregs: further investigations for Implementation at FACC ongoing
- Concept Studies for new Overhead Bins ongoing at FACC for future applications
- For Functional Integration further screening for future applications ongoing
- Process Control via DEA to be implemented also for Carbon prepregs in a next research project with the target to allow validate online parameter sets
- Recycling continuous implementation of project results into our composite recycling machines (learnings on material behaviour in the recycling process).
- Life Cycle Assessment (LCA) with the simple Excel Approach to be used during the first concept and RFQ phases

Further steps/(potential) follow-up projects

- Transfer the capabilities press molding into structural parts using carbon fiber as reinforcement
- Using DEA process control of press molded parts for structural applications (again with Wood K Plus)
- Further assess the processability of recycled composites and adapt materials to meet aircraft e.g. flame-retardancy requirements.
- Implementation of Cleanup Gate into recycling process with our waste customer (partly already integrated)
- New R&D projects will be an important part to secure longterm leadership in technological innovation