

## Presenters

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## 1) Introduction

### 1a) Envisa Introduction

### 1b) Background

### 1c) Project Introduction

## 2) Objectives and deliverables

## 3) Sustainability initiatives in the aircraft lifecycle

## 4) Major challenges

## 5) Next steps

# 1) Introduction

## Envisa

- Focus on the environmental impacts of aviation
- Solutions
  - ACA, LAQ, Noise, EMS, Biodiversity, Waste, Community engagement, Climate Change adaptation, Circular Economy and EoL management
- Working with stakeholders from the whole aviation sector (industry & public agencies)



Envisa team's experience in aircraft decommissioning and end-of-life:

- EU-funded AiMeRe project
- AFRA Aircraft EoL Key Performance Indicators
- IATA BIPAD Manual
- ICAO CAEP WG2: Aircraft End-of-Life State-of-Play Report
- LCA studies with EASA (e-aircraft and drones, full life cycle environmental impacts)



### Aircraft end-of-life issues (1)

#### Environment

- Hazardous substances (e.g. hydraulic fluids, electronic waste, asbestos, depleted uranium ballast)
- Minimizing waste and emissions
- Recycling of materials (challenges: carbon fiber; fire-resistant cabin furnishing) and re-use of aircraft components
- Environmental management of dismantling and recycling facilities
- Lifecycle considerations on GHG emissions for scenarios of decommissioning versus maintaining an old aircraft



### Aircraft end-of-life issues (2)

#### Safety

- Re-use of parts/equipment that have lost certification (black market)
- Aircraft cut up in questionable safety conditions

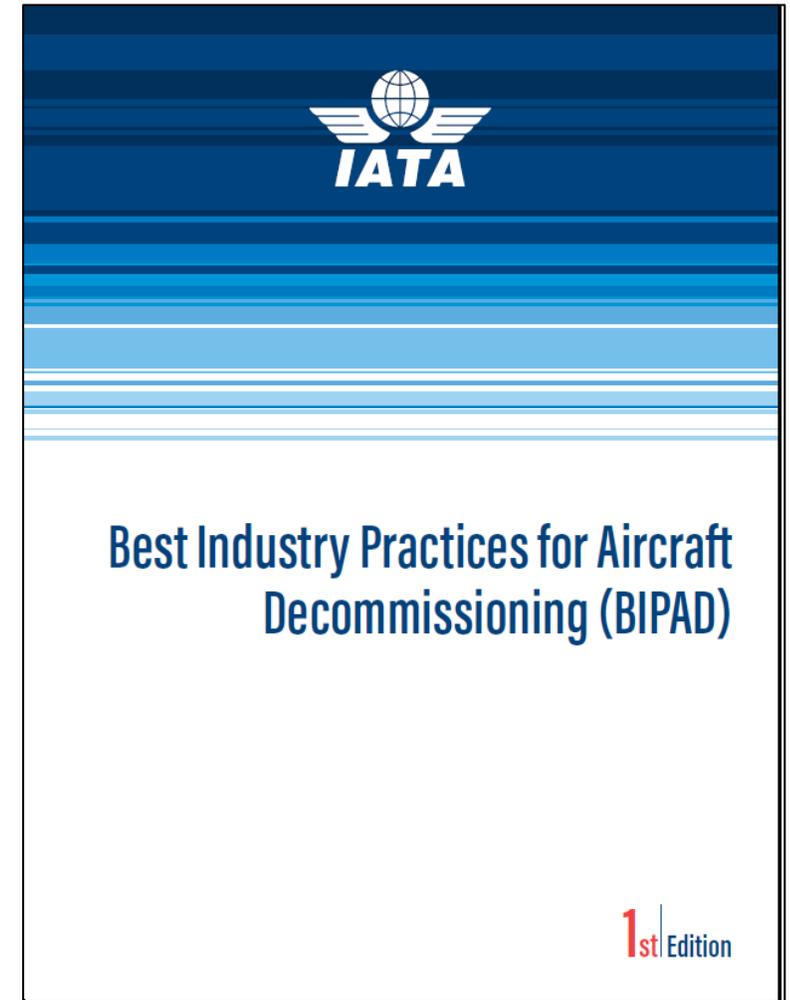
#### Further issues

- Stranded aircraft at airfield edges, obstruction of airport areas
- Last aircraft owner bankrupt or unidentifiable

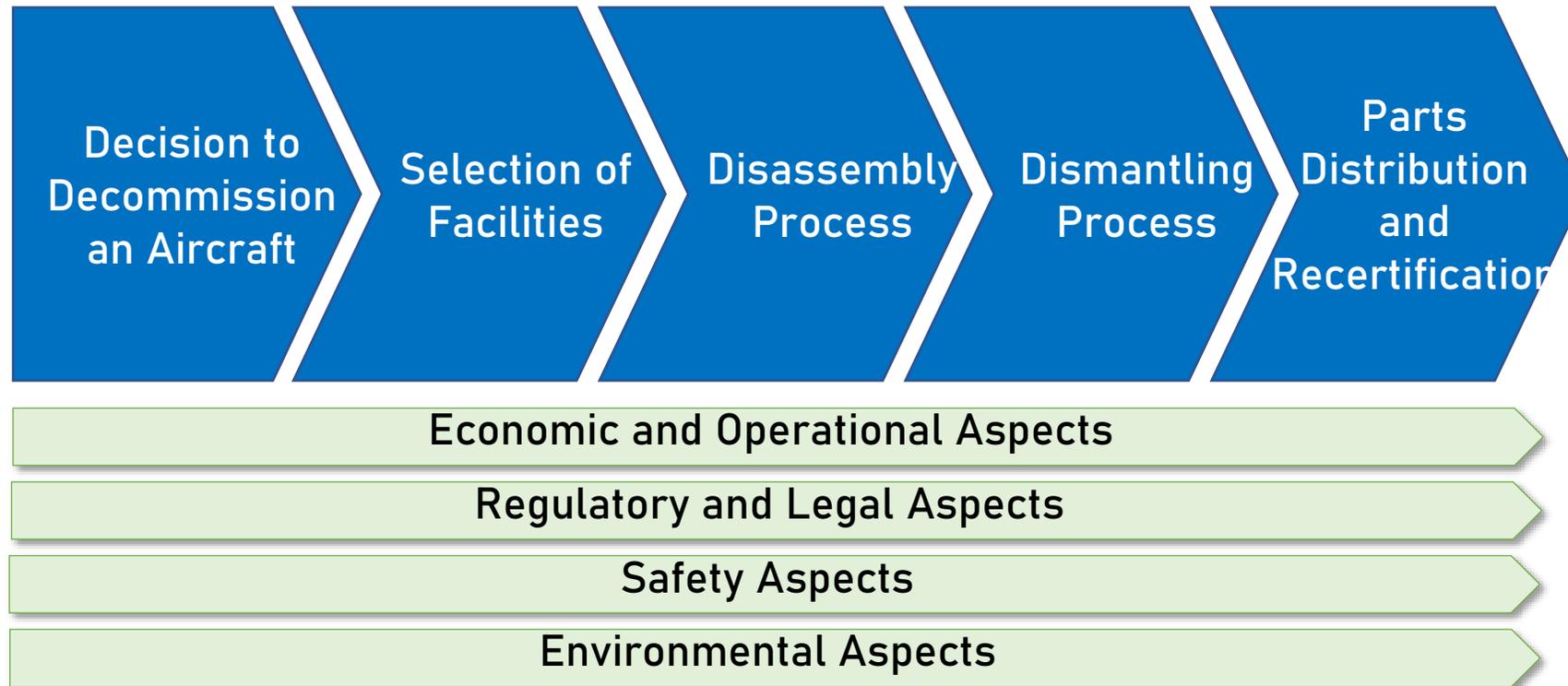


### IATA BIPAD development:

- Develop best practices for aircraft owners and operators
- Helping them how to manage aircraft decommissioning in a controlled process, optimizing residual value
- Multi-stakeholder coordination (airlines, AFRA, dismantling and recycling companies, aircraft and engine manufacturers)
- Multi-disciplinary process: Safety/Airworthiness, Environment, Economics
- Complementary to AFRA BMP

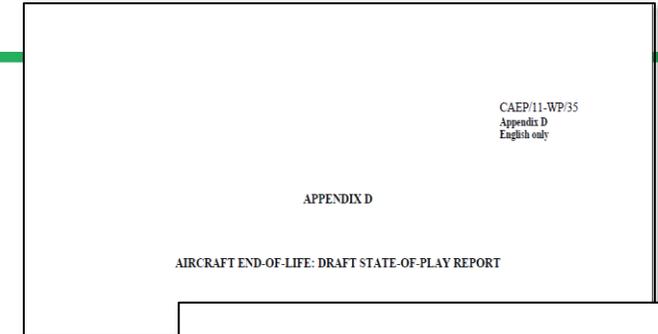


## IATA BIPAD structure



## ICAO involvement

- Aircraft decommissioning and recycling is a global business → ICAO may be helpful in harmonizing standards and regulations related to EoL
- ICAO CAEP WG2 (Airports & Operations) did study on “Aircraft End-of-Life State of Play” in CAEP/11 cycle (2016-19)
  - CAEP/11-WP/35 (CAEP internal)
  - Summary report in ICAO 2019 Environmental Report
- Motivation: stranded aircraft at airfield edges in developing & emerging countries
- Focus on existing standards, best practices and regulations
  - Relevant ICAO Standards and Recommended Practices (Annex 6: Operations, Annex 8; Certification, Annex 14: Aerodromes)
  - Documents on electronic waste (various UN organisations)
  - Basel Convention (control of transboundary movement of hazardous wastes and their disposal)
  - IMO documents on dismantling, waste treatment and recycling of ships.
  - Industry best practices: AFRA BMP and IATA BIPAD
- Currently no continuation of the EoL work in ICAO
- Issues that may benefit from ICAO support to be identified



## Project introduction

### Sustainability → crucial topic

- EU Green Deal
- EASA Sustainability Aviation Programme
- Sustainable Aviation Committee

### Decision to assess the current state of sustainability in:

- M&P Domain
- Aircraft EoL

### First steps:

- Initial sustainability analysis
- Research study to determine the status quo



**Sustainable Aviation - towards zero emission Aviation**

## General project goal

*To provide a clear picture concerning the current attention paid to environmental aspects by EASA approved M&P organisations in their culture, policy, and systems.*

This includes:

- management of reduction of waste and energy;
- the disassembly of aircraft and the subsequent redistribution of aircraft parts and the re-use or recycling of materials;
- the application of life cycle assessment and/or circular economy concepts in general;
- and other co-related areas/activities in MRO, such as proper awareness, technical culture management, procedures, and oversight are also considered.

This will allow the provision of guidelines to EASA to react and improve the situation in Europe regarding the sustainability of the sector.

## Connection with ASA-AFRA

### ASA

- MRO
- Parts reuse

### AFRA

- Disassembling
- Recycling



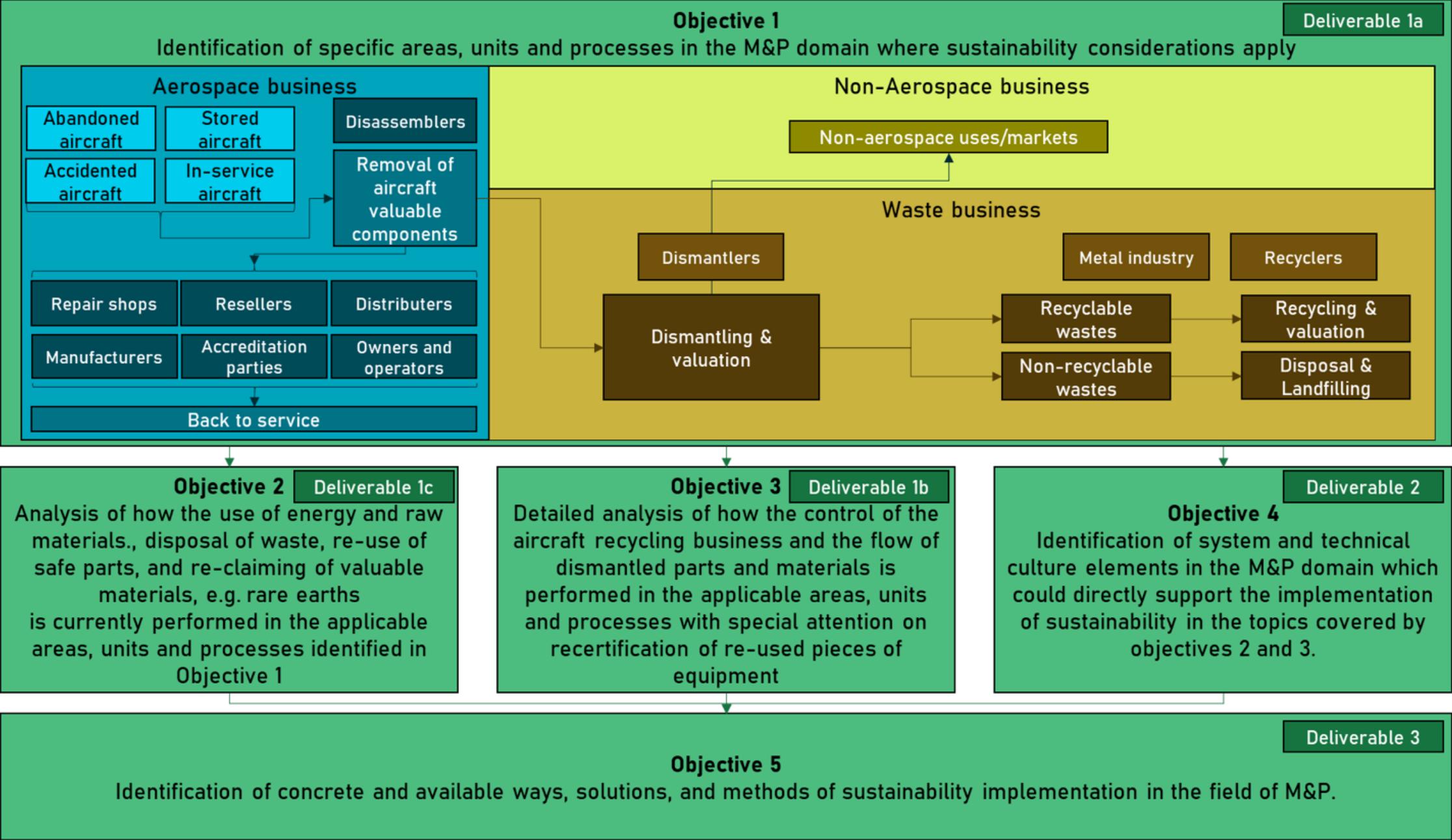
### Inputs to the project

- Information about current sustainability initiatives and practices
- Identification of areas to be improved
- Proposal of possible solutions and improvements to increase the sustainability of the sector

Identification and coordination of international sustainability initiatives in the aircraft lifecycle

## 2) Objectives and deliverables

# Objectives and Deliverables



## 2) Objectives and Deliverables

Gather information about the current situation of sustainability in the aviation M&P sector – Overview of the Status quo → Deliverable 1

August 2022

Identification of concrete solutions to enhance sustainability in the sector → Deliverable 3

June 2022

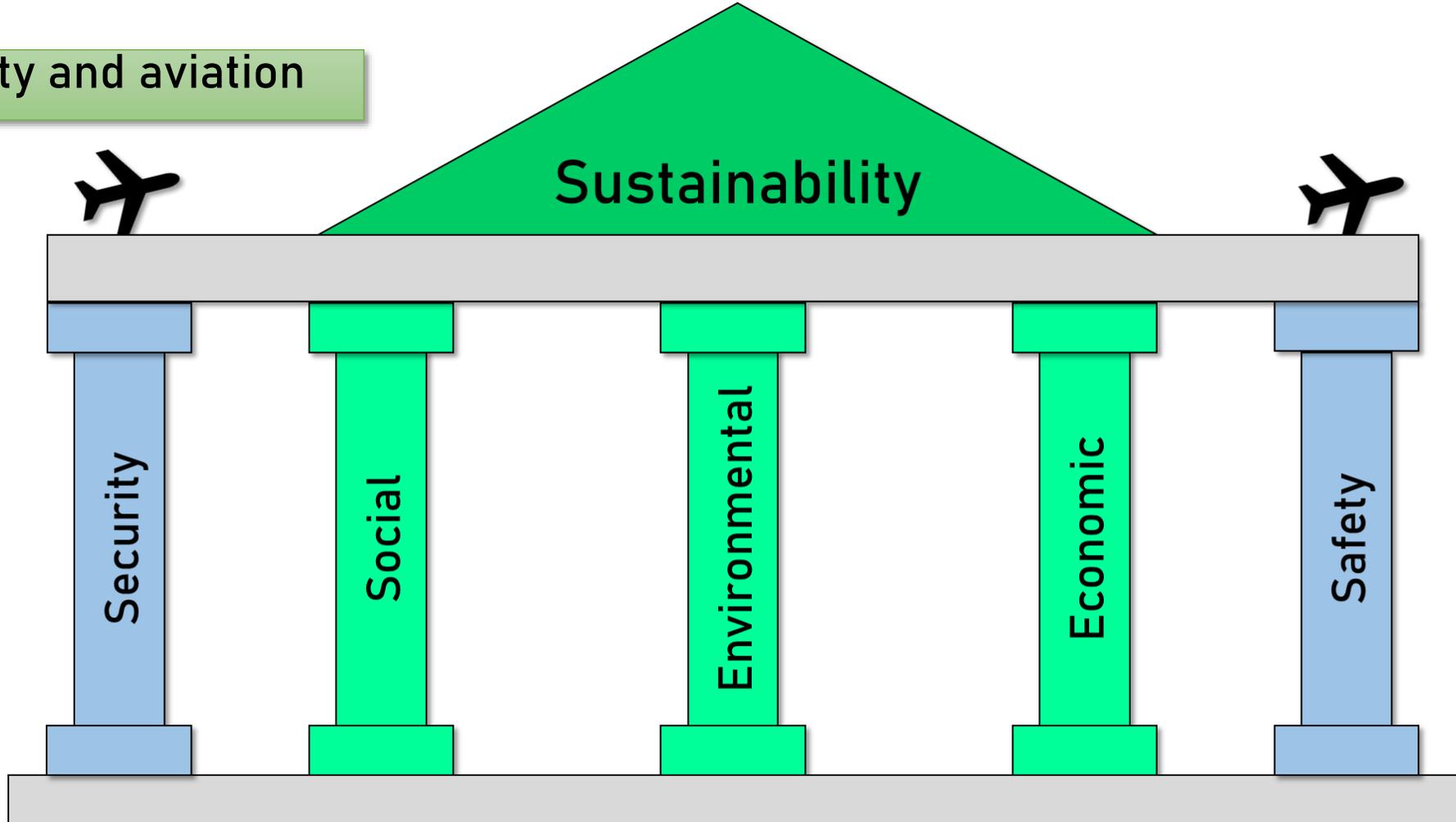
Description of the technical and cultural elements in the sector that can support the implementation of sustainability initiatives → Deliverable 2

October 2022

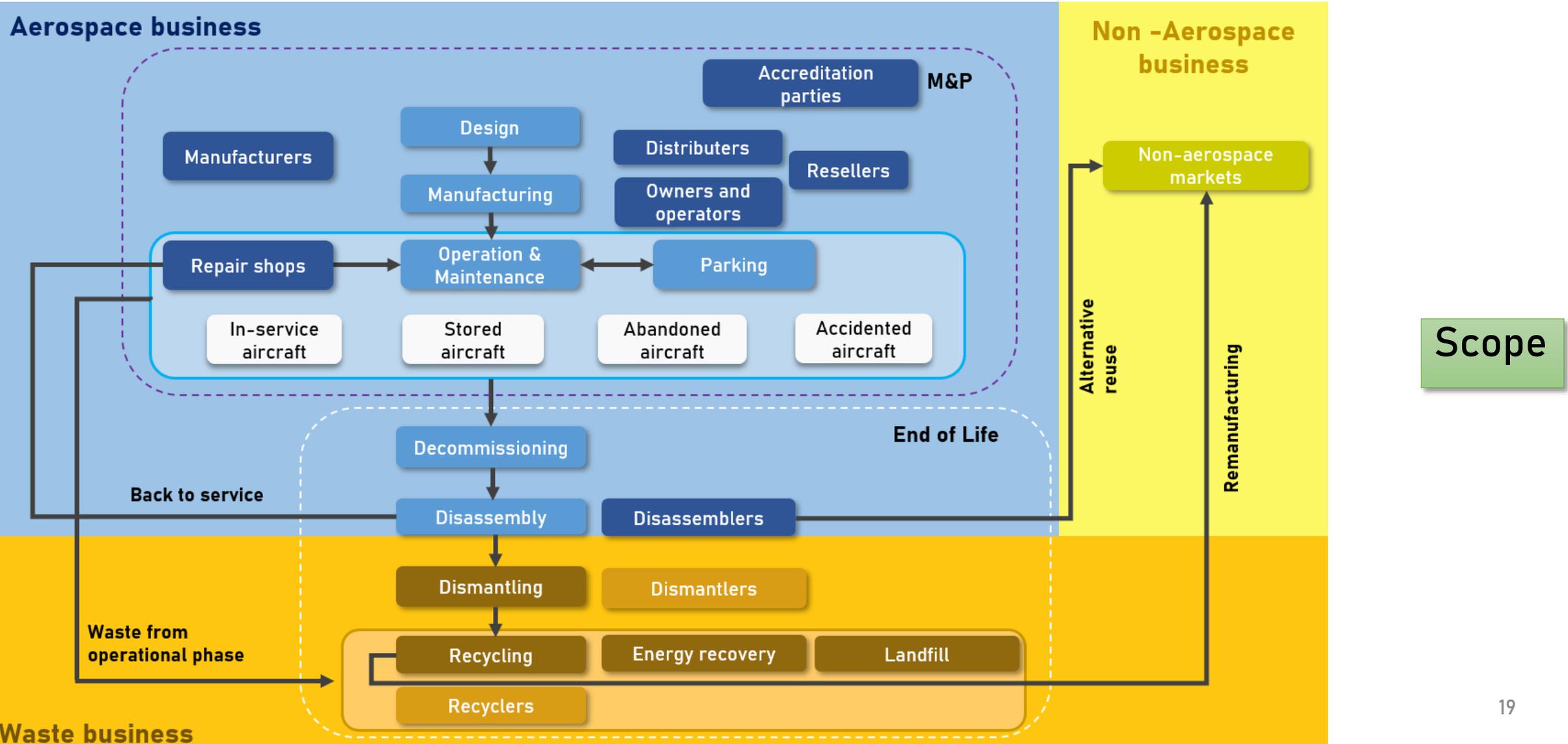
# 3) Sustainability initiatives in the aircraft lifecycle

### 3) Sustainability initiatives in the aircraft lifecycle

Sustainability and aviation



### 3) Sustainability initiatives in the aircraft lifecycle



## 3) Sustainability initiatives in the aircraft lifecycle

### Standards and regulations

- ISOs 9000, 14000 series
- EU EMAS
- ASA-100 and FAA AC00-56
- (EU Taxonomy)
- ...

### Handbooks

- AFRA BMP
- IATA BIPAD
- IATA PAO:TO

### Sustainability projects

- PAMELA-LIFE
- Upcycling projects
- SUSTANAIR
- AiMeRe
- AFRA Aircraft EoL KPIs
- Design for decommissioning

## 4) Major challenges

Lack of aircraft-specific waste regulation

Increase attention to alternative reuse

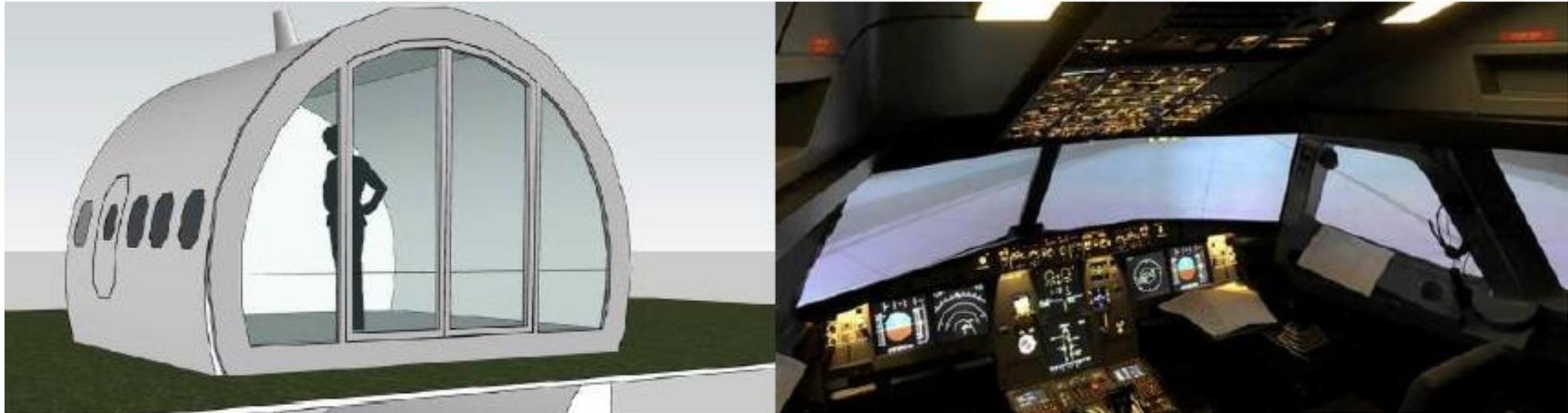
Foster Eco-design

Recycling of new materials

### Lack of aircraft-specific waste regulation

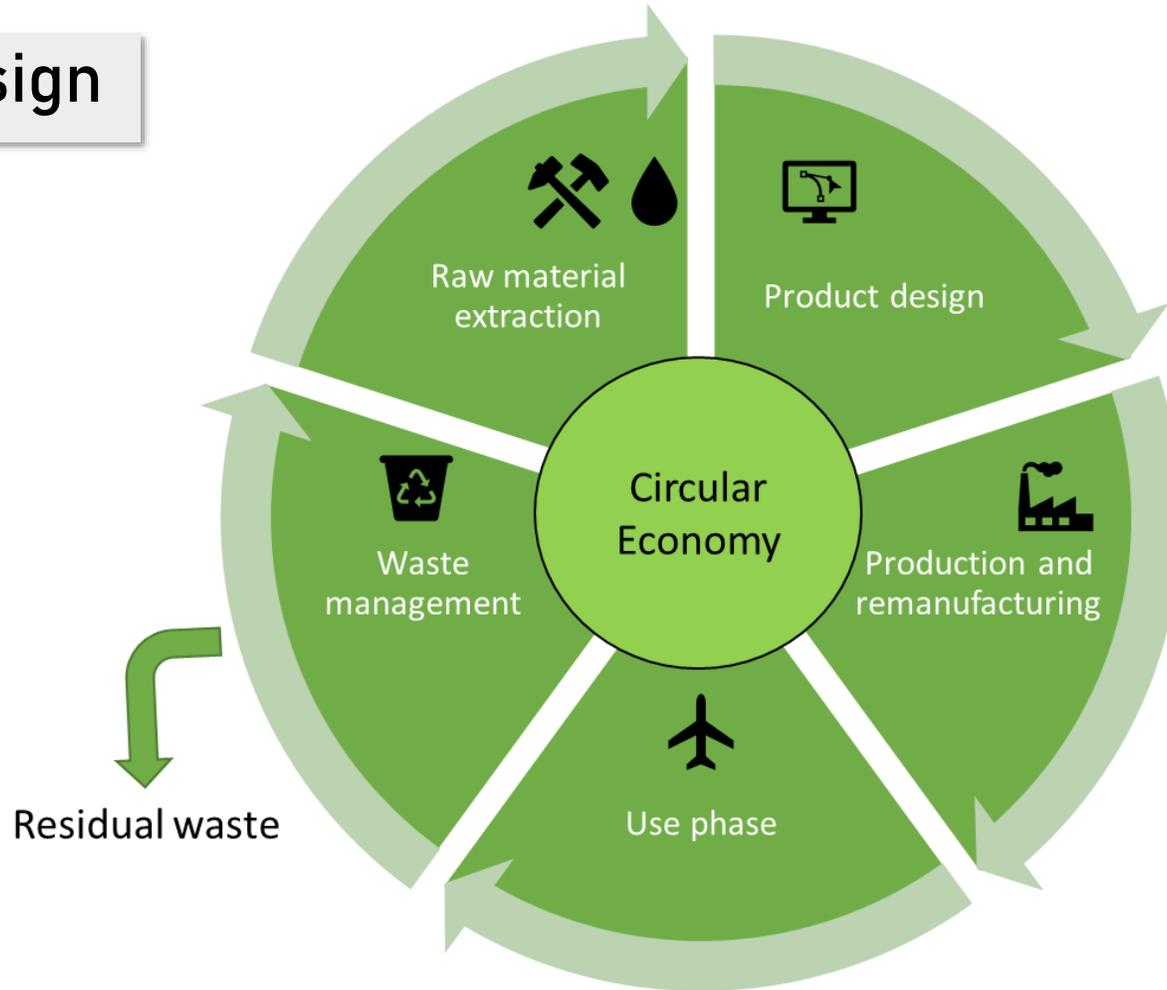


### Increase attention to alternative reuse

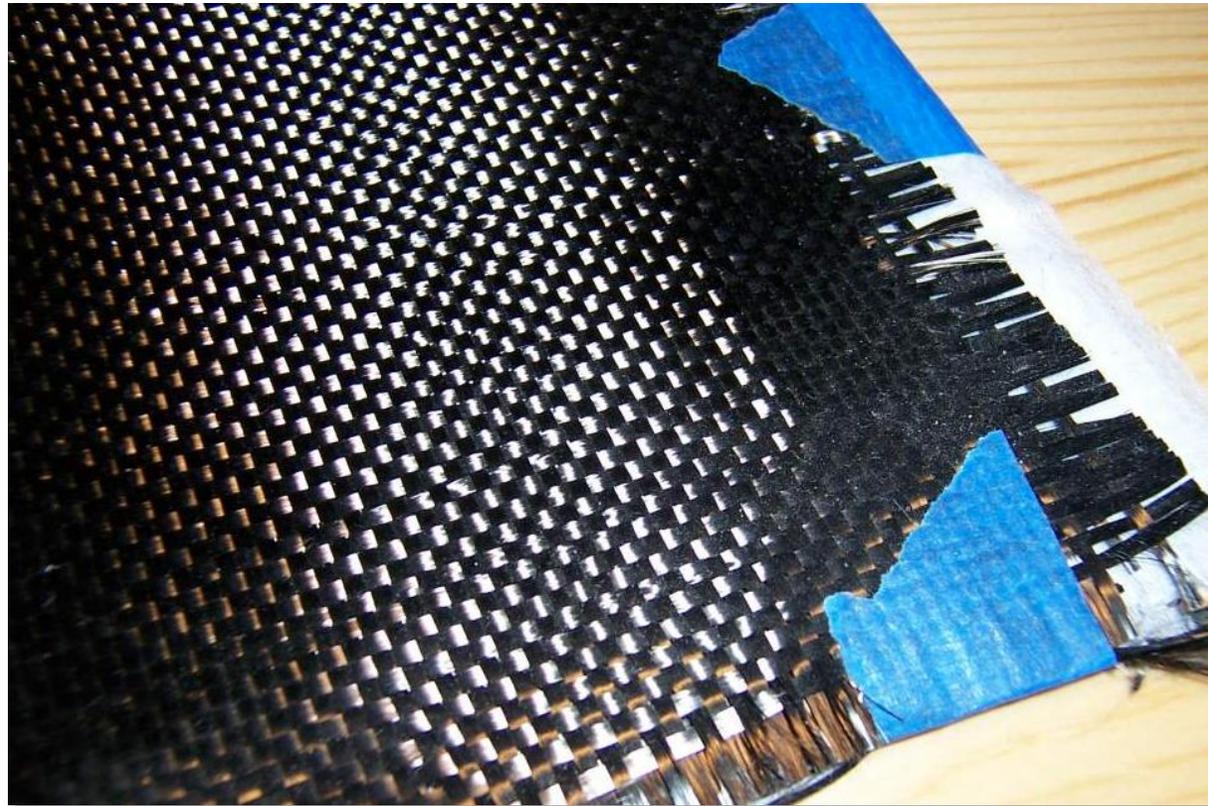


Courtesy of AeroCircular

## Foster Eco-design



### Recycling of new materials



*Hadhuey at German Wikipedia, CC BY-SA 3.0 <<http://creativecommons.org/licenses/by-sa/3.0/>>, via Wikimedia Commons*

# 5) Next steps



### Input from ASA-AFRA Conference attendees on:

- Initiatives currently in place to enhance sustainability in their sectors and their application in day-to-day practices
  - Applicable regulations
  - Standards
  - Best practices handbooks
  - Data reporting
  - Sustainability assessment techniques (e.g. Life Cycle Assessments)
  - R&D Projects
  - Etc.

### Input from ASA-AFRA Conference attendees on:

- Collaboration among stakeholders to support these sustainability initiatives
- Suggestions to improve the performance of the initiatives and proposals for new ones
- Inclusion of sustainability in trainings
- Data reporting on aircraft parts reuse, materials recycling, energy recovery, alternative reuse, etc.
- Aspects that require more attention in order to enhance the sustainability of the sector

# Thank you for your attention!

## Any questions?

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