



RECOAT

Recycling of coated and painted textile and plastic materials

Recycling of coated and painted textile and plastic materials

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20201015 Online

Co-funded by the
European Union



Outline

- The Need
- The Idea
- The Project
- Some first results

The logo for DeCOAT, featuring a stylized green 'D' with a white arrow pointing right, followed by 'eCOAT' in a grey, sans-serif font.

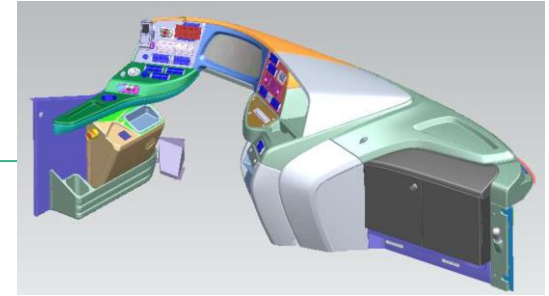
Recycling of coated and painted textile and plastic materials.

The Need...

The DeCOAT logo, identical to the one in the top left, featuring a stylized green 'D' with a white arrow pointing right, followed by 'eCOAT' in a grey, sans-serif font.

Recycling is not evident, especially of coated items

- Coated textile and plastic items are abundant, in various application areas
- Estimated yearly amounts of waste relevant for DECOAT technology*:
 - **Automotive parts:** ca. 2.1 million tons coated plastics from end-of-life vehicles (ELV)
 - **Heavy vehicles parts:** ca. 800 ktons coated plastics
 - **Electronic goods:** ca 200 ktons coated plastics from WEEE (waste electrical and electronic equipment)
 - **Coated textiles:** ca 350 ktons (yearly market ca. 1 million tons)



*based on project internal estimates of the total annual market for these products

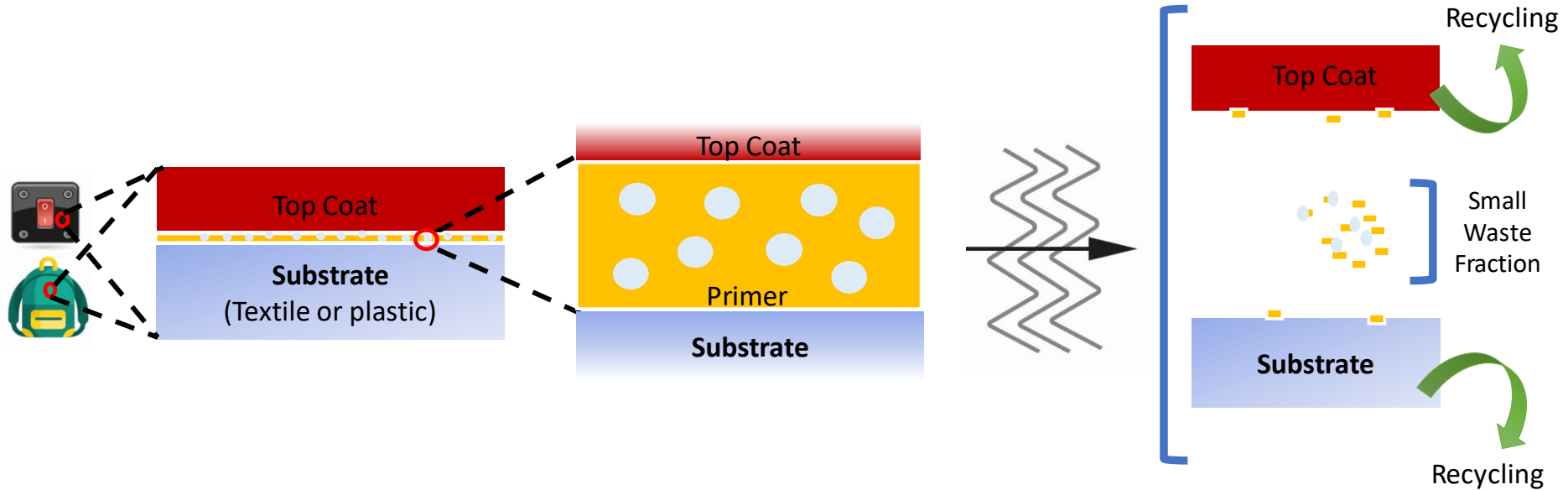
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The Idea...

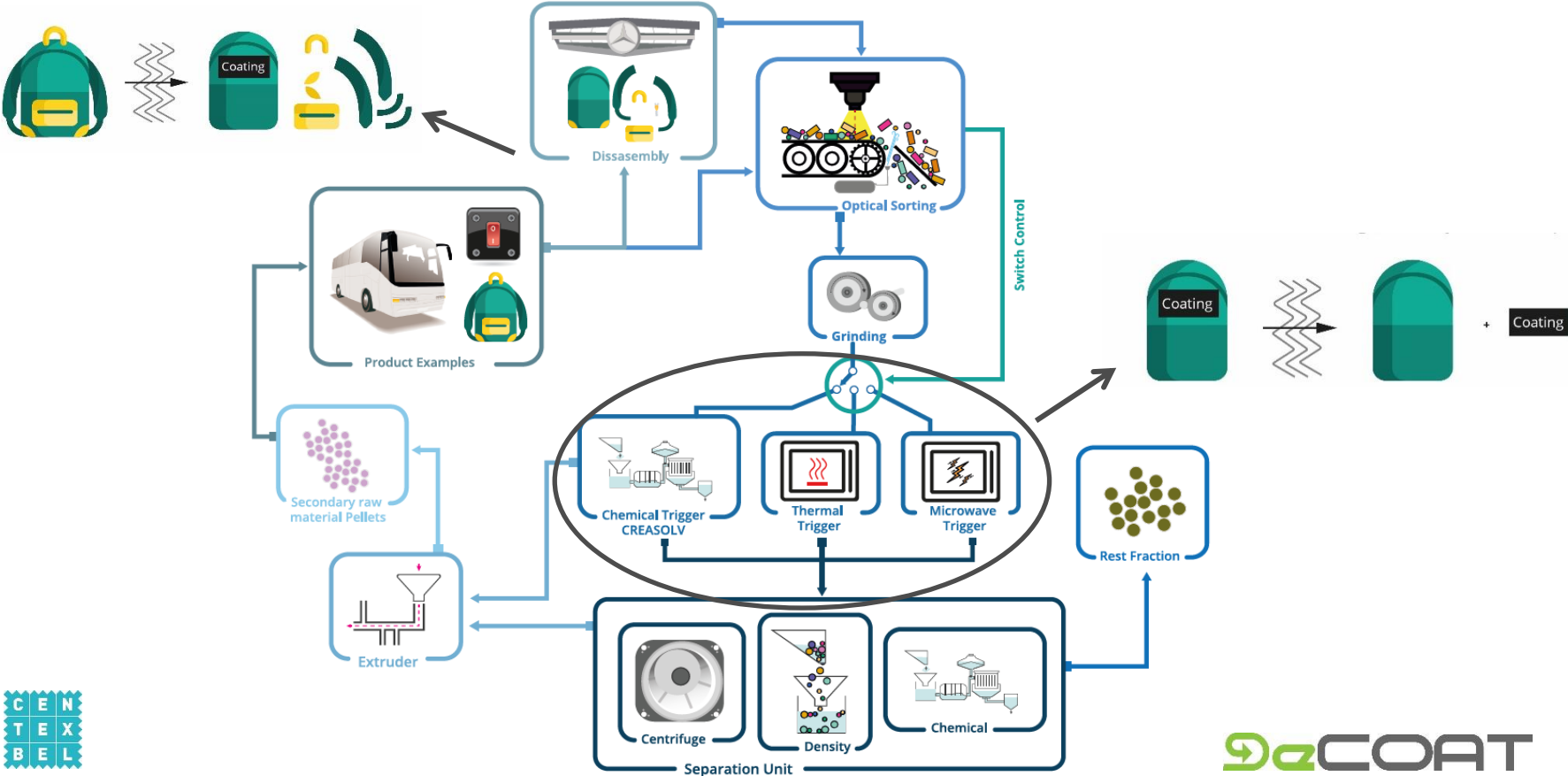
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Core idea: 'Triggerable coatings'



- **'Coatings'**: functional and performance coatings on textiles, paints on plastics, foil lamination and adhesion layers for plastics parts
- **'Triggerable'**: via thermal (heat, steam), microwave, chemical (Creasolv®), ...

Overall concept



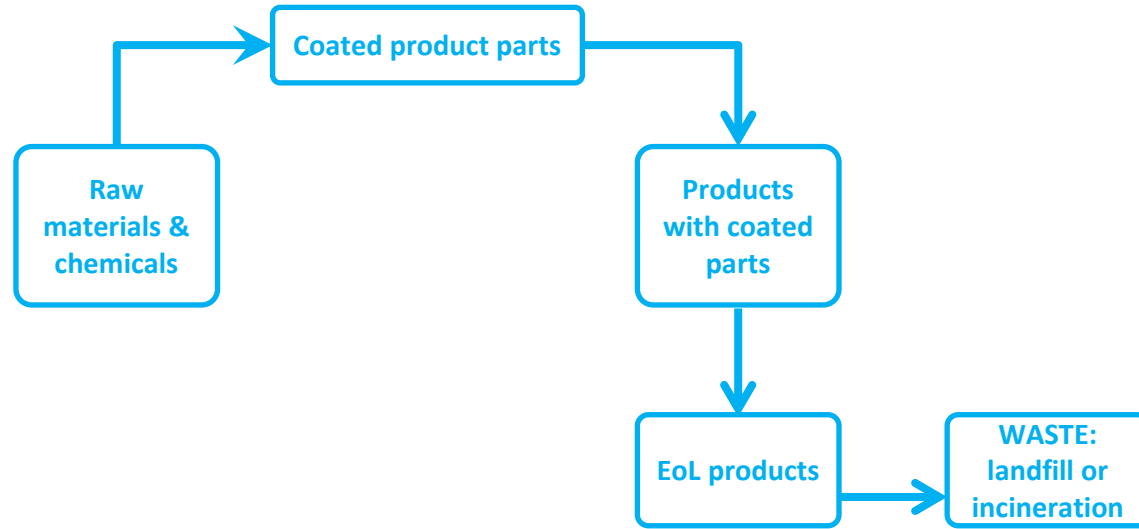
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The Project...

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Key objectives



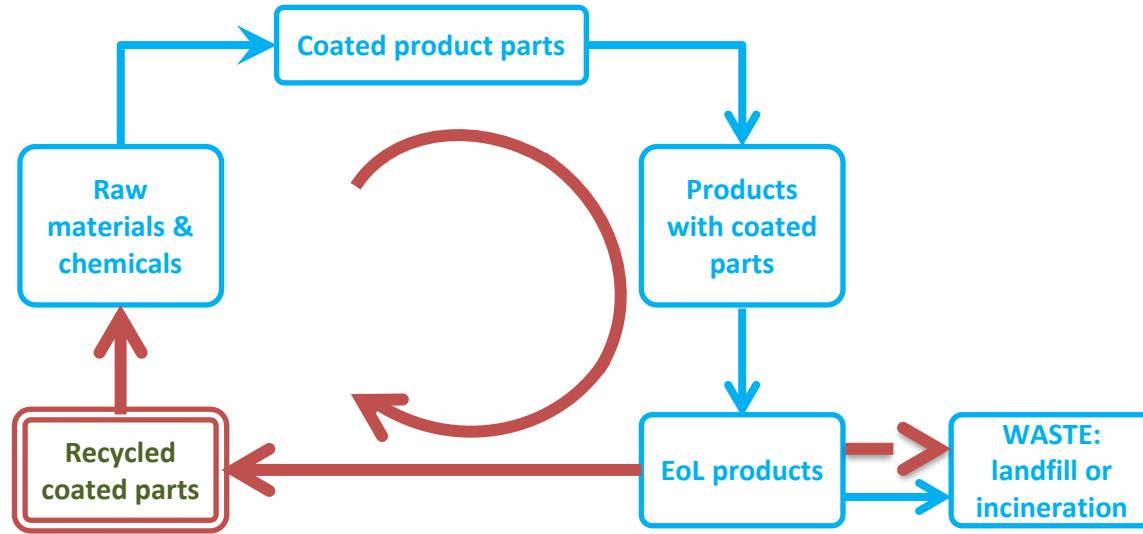
Current
material
flow



DECOAT solution for
missing gap in
circular use of coated
parts

DECOAT

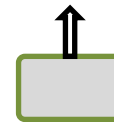
Key objectives



Current material flow



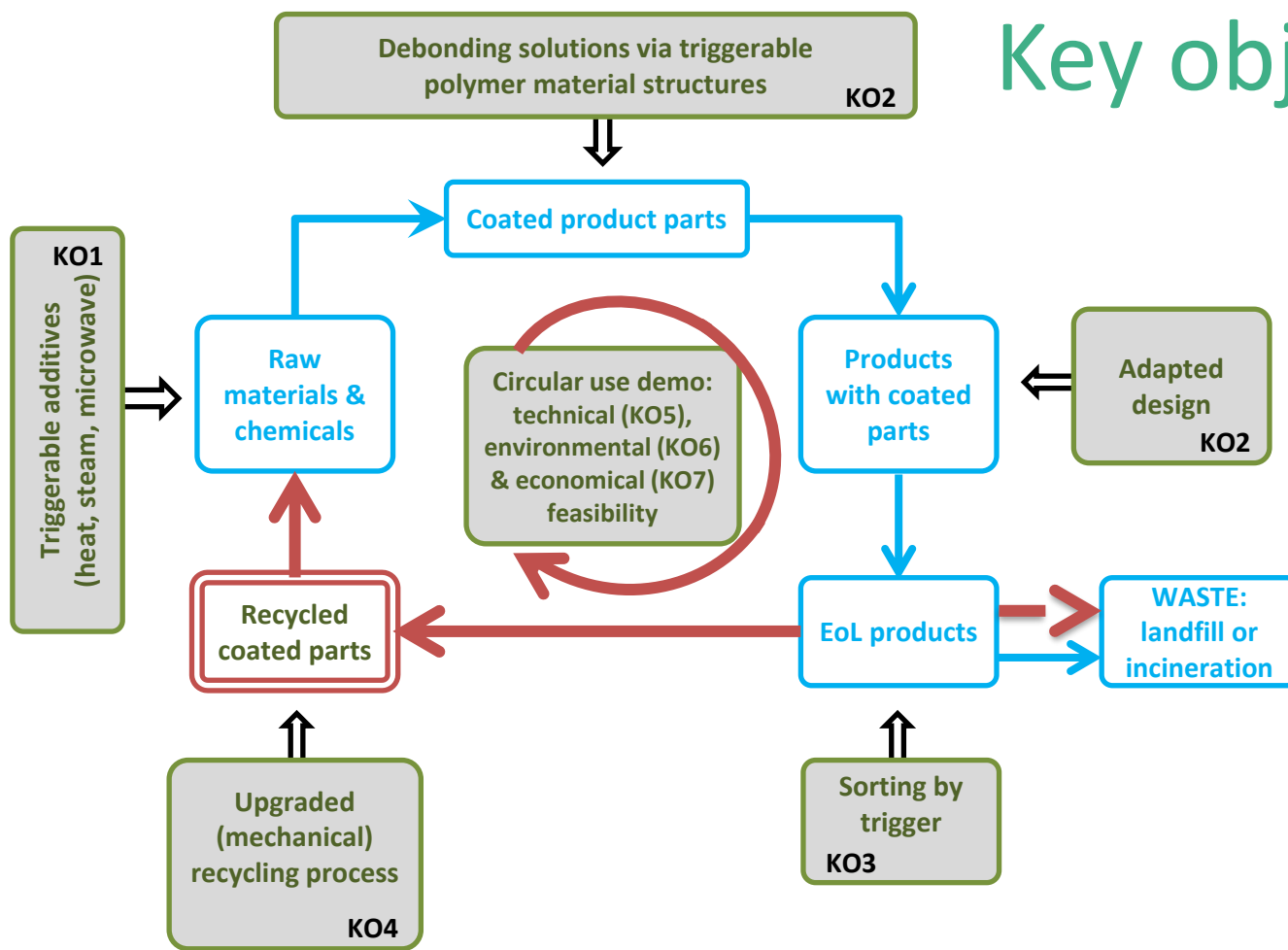
DECOAT solution for missing gap in circular use of coated parts



DECOAT contributions to strengthen circular use



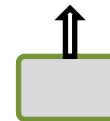
Key objectives



→ Current material flow



DECOAT solution for missing gap in circular use of coated parts



DECOAT contributions to strengthen circular use



Consortium

End Users



Technology Providers



RTD



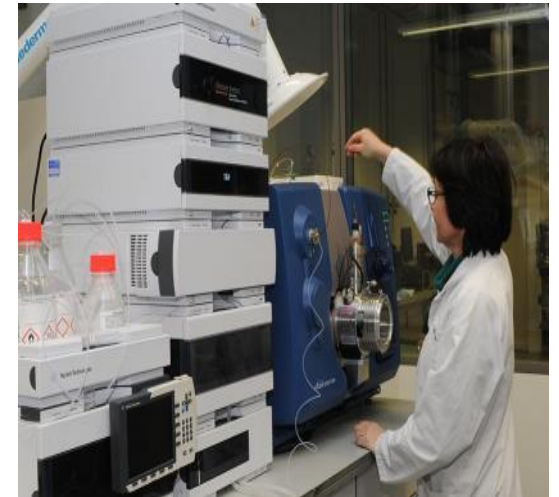
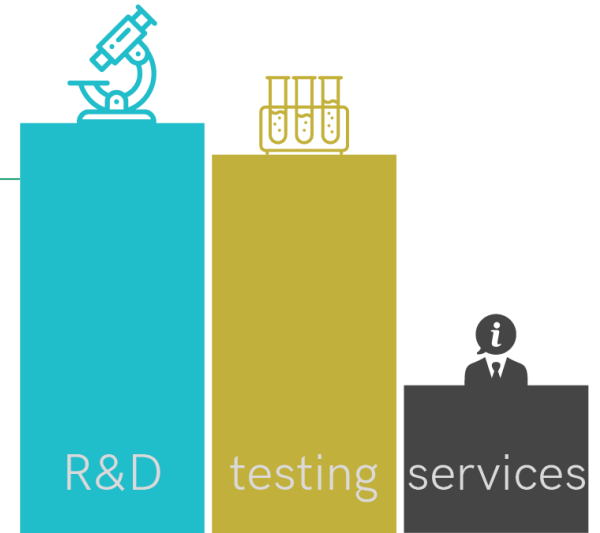
National Technical University of Athens

Innovation Support



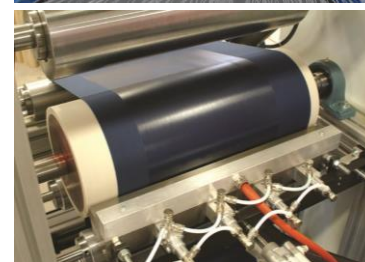
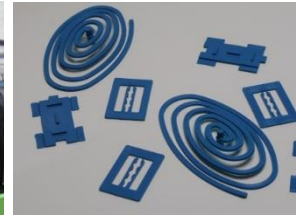
Centexbel - Coordinator

- Technology centre in Belgium, for textiles and plastics
- Activities:
 - R&D
 - Testing
 - Services
- Non-profit



Centexbel – R&D Strategy

- **Close to industry:**
 - Needs
 - Opportunities
- **Sustainability:**
 - Resource efficiency
 - Recycling of materials
 - Bio-based materials
- **Materials processing along the value chain:**
 - Materials compounding & characterisation
 - Melt extrusion into filaments, 3D printing
 - Weaving, knitting & braiding
 - Coating & Finishing



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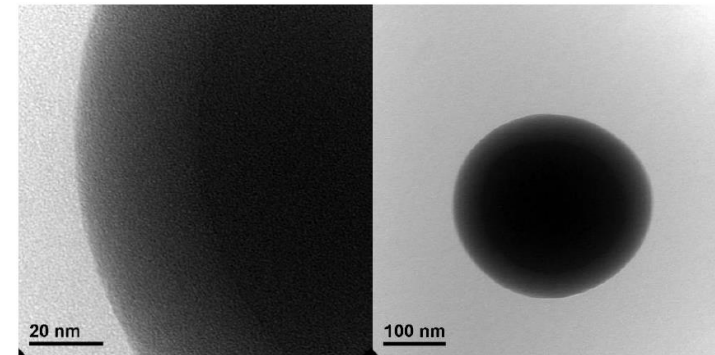
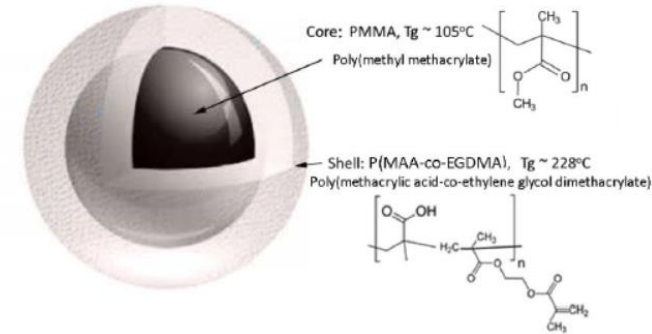


Some first results...

The DeCOAT logo, identical to the one at the top left of the slide.

Triggerable materials microcapsules for heat/moisture trigger

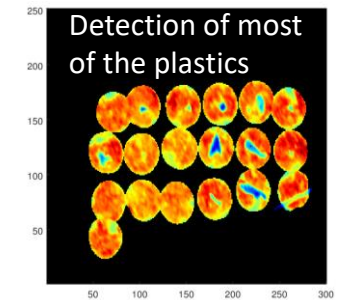
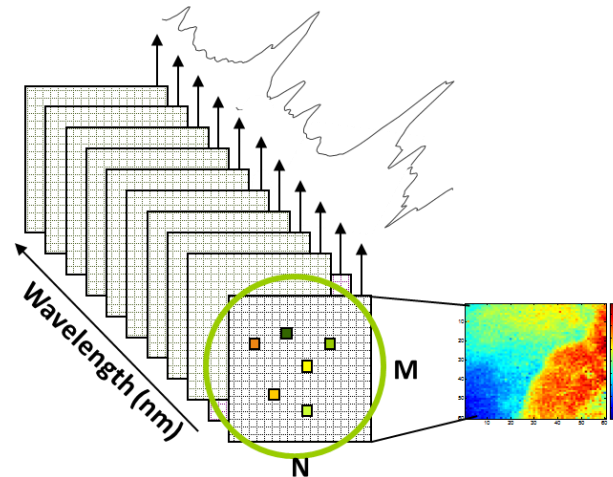
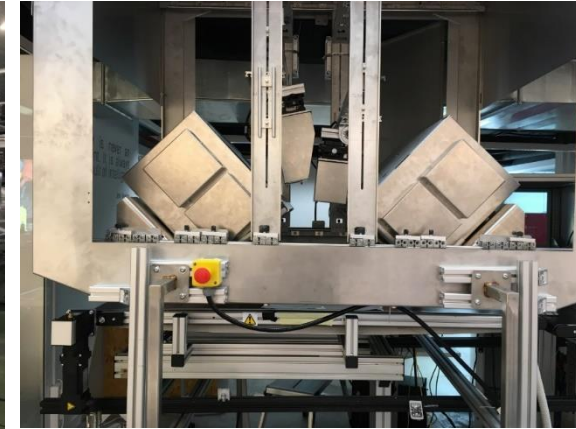
- Microcapsules: weakening upon heating & release of 'lubricant'
- SAP (Super Absorbent Polymers): swelling upon contact with steam/water
- Blowing agent: triggered 'inflation' of particles



Identification techniques for triggerable materials

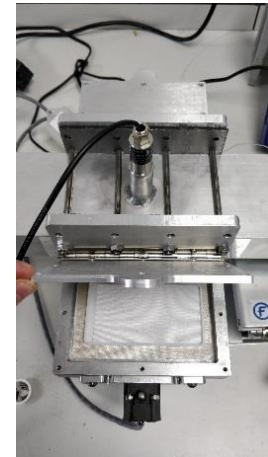
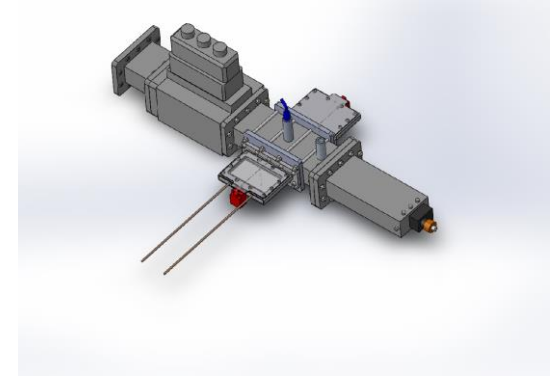
Hyperspectral Imaging (HSI):

- Imaging technique for triggers
- Generation of images in which every pixel contains a spectrum
- Chemical analysis of a whole image



Development of microwave equipment for applying the trigger

- Selection of microwaveable triggers:
 - Type of material (e.g. Carbon containing)
 - Amounts of material
 - Distribution of trigger material
- Simulation of ‘ideal dosing’ of microwave energy
- Development of dedicated microwave equipment



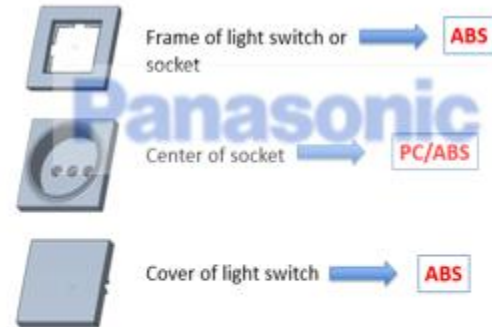
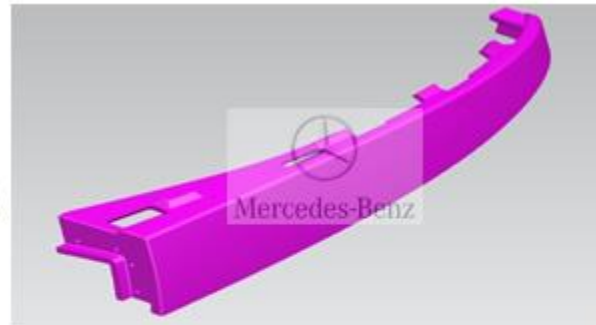
Debonding on textile

- Focus on three types of coating: PVC, PU & Acrylates
- After (thermal) trigger, need a mechanical separation step



Next step: apply to DECOAT demonstration cases

- **Bike bag** – coated textiles, produced by VAUDE
- **Cockpit part** for a bus, produced by Mercedes-Benz
- **Switches and sockets**, produced by Panasonic
- **Fascia and rear door garnish**, produced by Maier



But quite some challenges remain

- **Performance** – prevent unwanted triggering/ lower properties of actual coating
- **Cleanliness** – assessment of remaining contamination on substrate after debonding
- **Ecological aspect** – limit impact needed for trigger production & for debonding process (energy)
- **Economic aspect** – need an economy-of-scale for debonding infrastructure

→ Work in progress ...

DECOAT Acknowledgement

- ALL DECOAT PARTNERS
- Funding:
 - Funded within H2020 (NMBP call)
 - Total project budget: € 5.90 mio.
 - Coordinator: Centexbel
 - Start: January 1st 2019
 - Duration: 4 years



This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No 814505.

DECOAT website – www.decoat.eu



Project Structure Need, Goals and Objectives.

The Need



The last decade has experienced a strong increase in technological developments for improved material functionality. One of these involves surface treatments, which employ complex (multilayer) structures designed to provide multifunctionality in a single solution. Within DECOAT, for the

The Goal



Recycling of coated and painted textile and plastic materials. The main goal of DECOAT is to enable the circular use of these parts by developing novel smart polymer material systems and their corresponding recycling processes, currently a missing link. We will demonstrate the project results via concrete