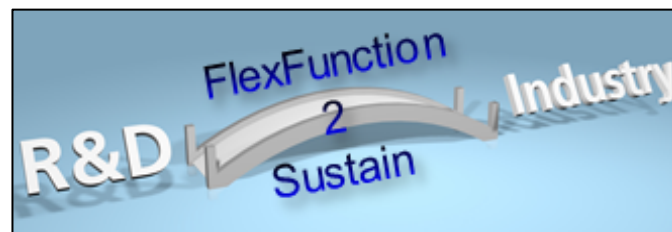


FlexFunction2Sustain

Open Innovation Ecosystem for Sustainable Nano-Functionalized Plastic and Paper Surfaces and Membranes



This project has received funding from the European Union's Horizon 2020 research and innovation programme under [grant agreement n°862156](#)

What is an Open Innovation Test Bed?



- **Open Innovation:** Increase innovation potential by accessing external partners in the innovation process
- **Open Innovation Test Bed - OITB:** Open platform for evaluation and maximisation of the innovation potential of novel ideas, technologies, and products.
 - Network of Suppliers for complementary innovation boosting services
- **Single Entry Point:** Commercial Company as Industry's Access Point to OITB Services

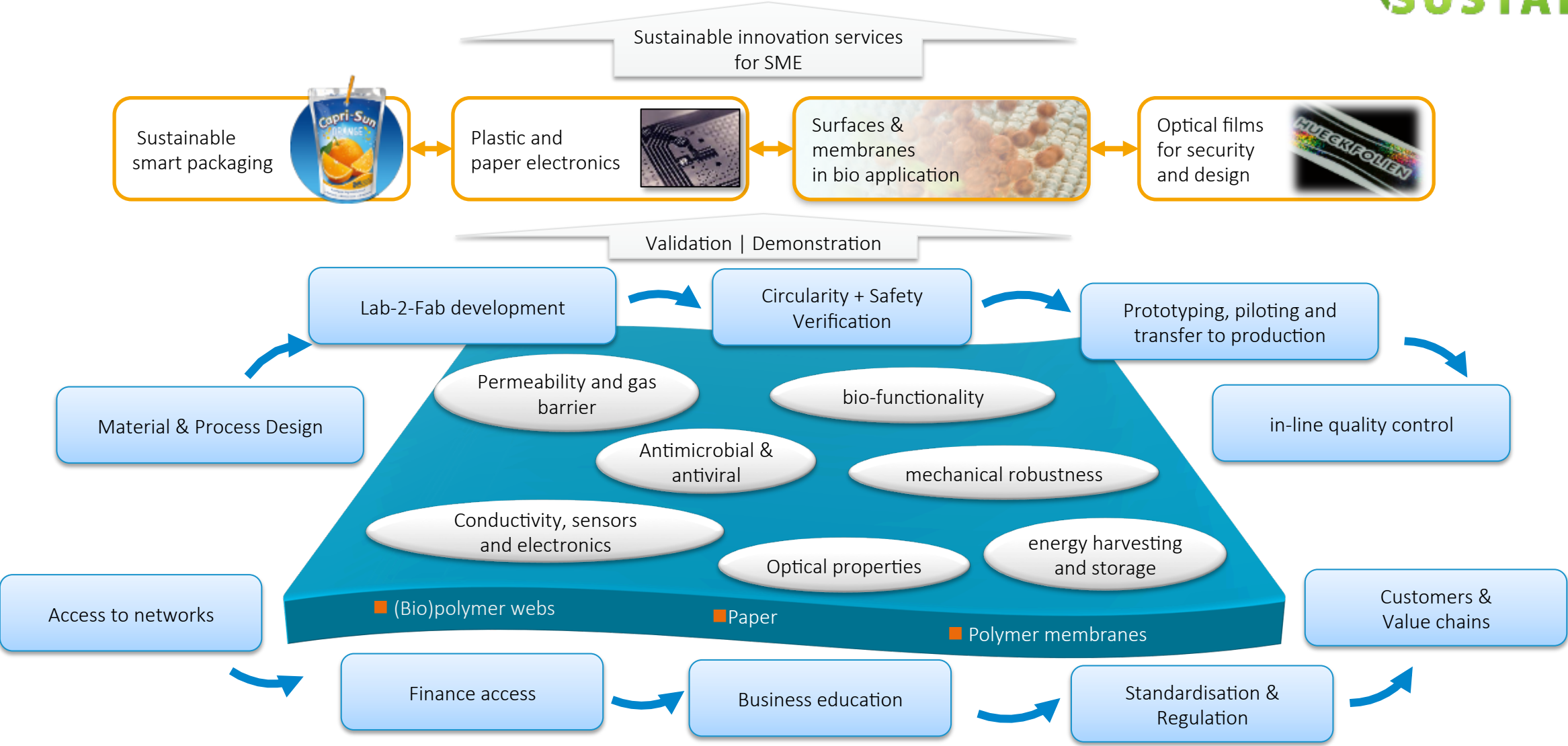
A photograph of a beach heavily littered with plastic waste, including numerous discarded plastic bottles, fragments of plastic, and other debris. The waste is scattered across the sand, extending from the foreground towards the water's edge. The water is visible on the right side of the frame.

FlexFunction2Sustain boosts innovation for sustainable and smart plastic and paper products

- ➔ drastically reduce plastic waste
- ➔ get ready for the digital age

making use of
nano-functionalization of novel plastic and paper surfaces

FlexFunction2Sustain OITB Concept



The FlexFunction2Sustain Ecosystem



OITB Members

Industrial Validation

Potential Clients

External Stakeholders



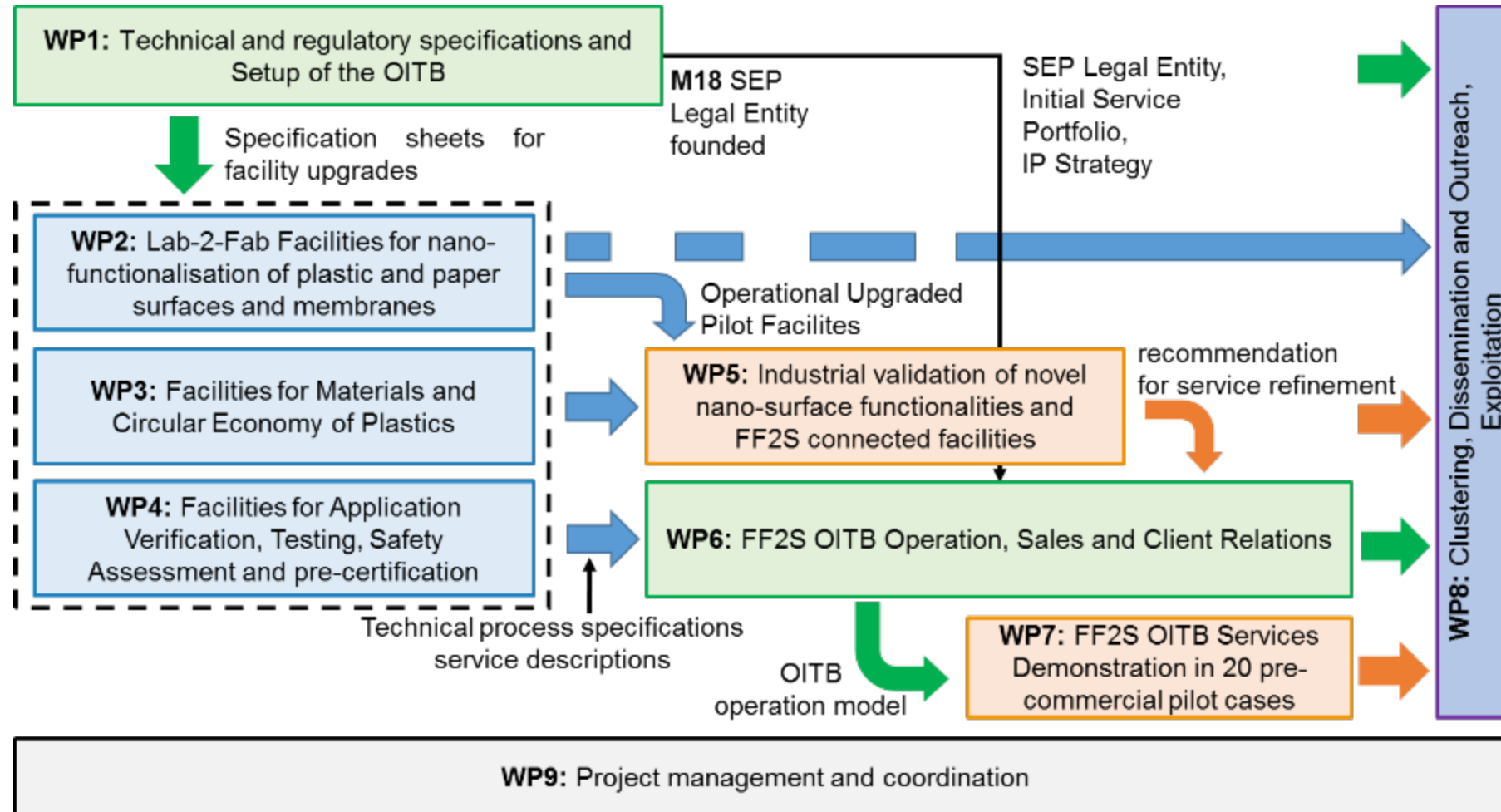
Board of Investors
and Foundations

External Advisory
Board

(Networks,
Regulations,
Standardisation,
and others)

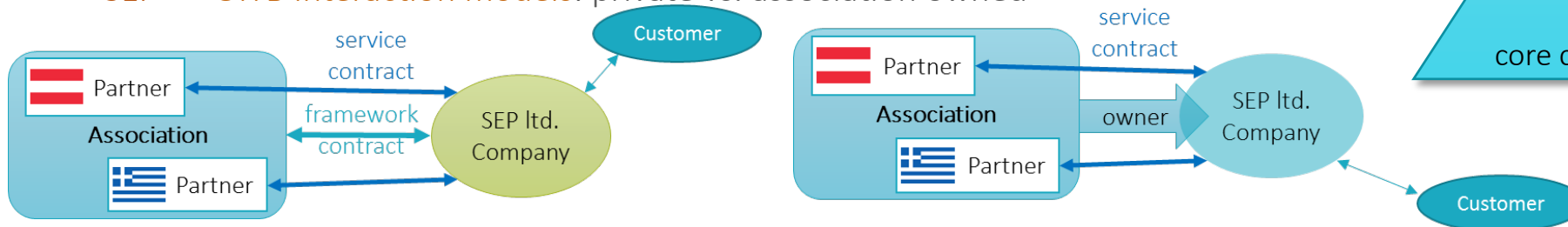
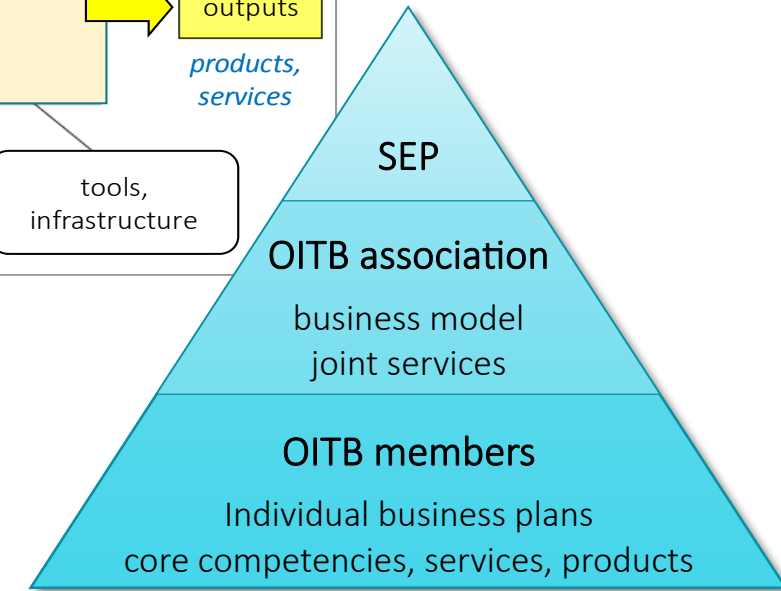
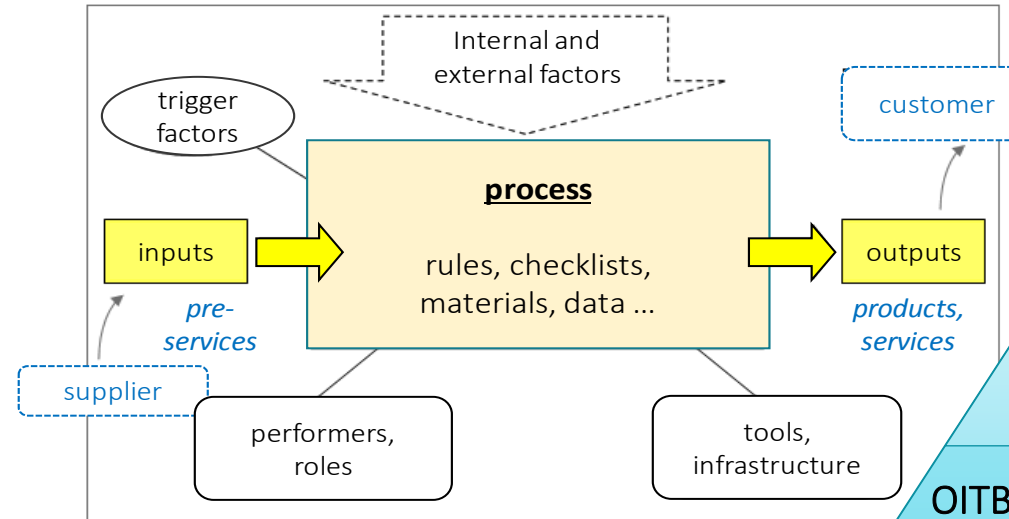
Achievements until Month 18

Our work plan towards a sustainable Open Innovation Ecosystem ...

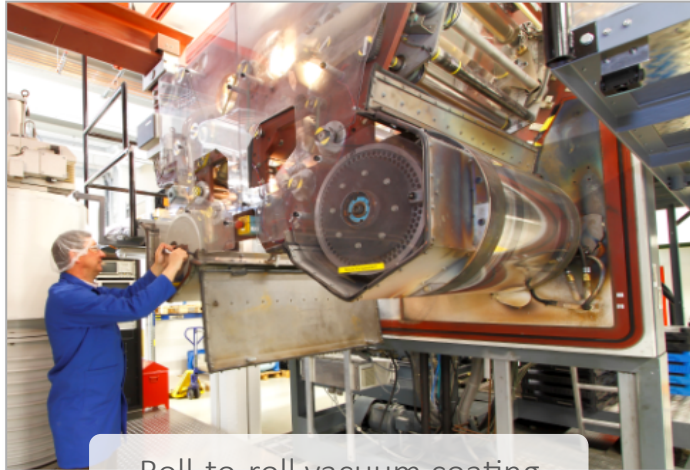


Work Package 1 – Setup of the OITB

- **Technical specifications:** completed
- **Operations Procedures:** guidelines completed
- **Data Management Plan:** completed for project continuous implementation within OITB
- **OITB Business & Sustainability Plan:** three level business model:
Members ⇔ OITB association ⇔ SEP
- **OITB Legal Structure:** Intended OITB structure:
 - **Non-profit association:** collaborative network of experts
 - **For-profit limited liability company:** commercial SEP to customers
- **SEP ⇔ OITB Interaction models:** private vs. association owned



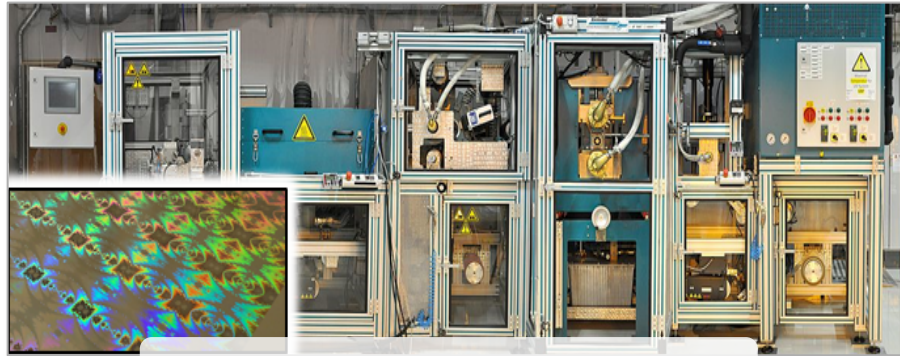
Lab-to-Fab nano-surface treatment



Roll-to-roll vacuum coating



Atmospheric pressure coating,
printing and surface treatment



R2R micro- and nanostructuring



Printed electronics pilot lines

- from sheets to roll
from about $2 \times 2 \text{ cm}^2$
up to $> 1000 \times 0.6 \text{ m}^2$
- all major thin film technologies
evaporation, sputtering,
slot-die coating, corona
treatment, nanoimprint
lithography, ...
- small-series production
capacity available
 $10\,000 \text{ m}^2$ and more

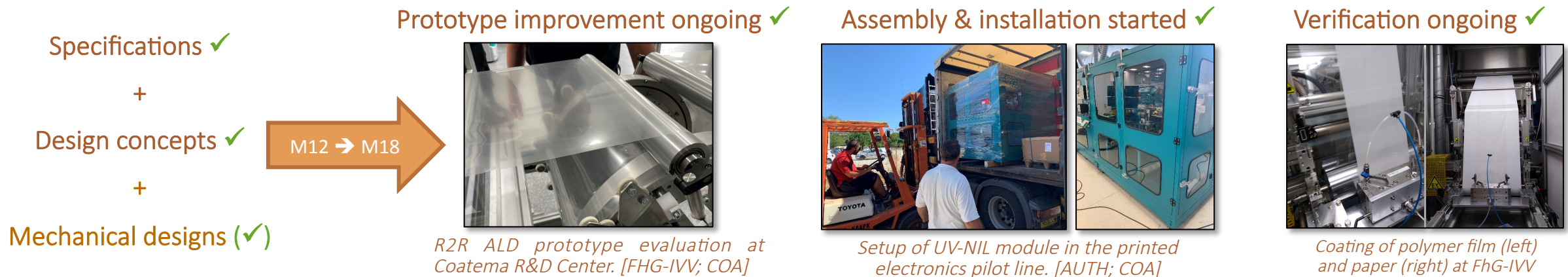
WP2: M12 – M18 achievements

36 machine upgrades at 8 partner sites

Objectives: Enable processing of biopolymers; increase process reliability and productivity; complete process chain

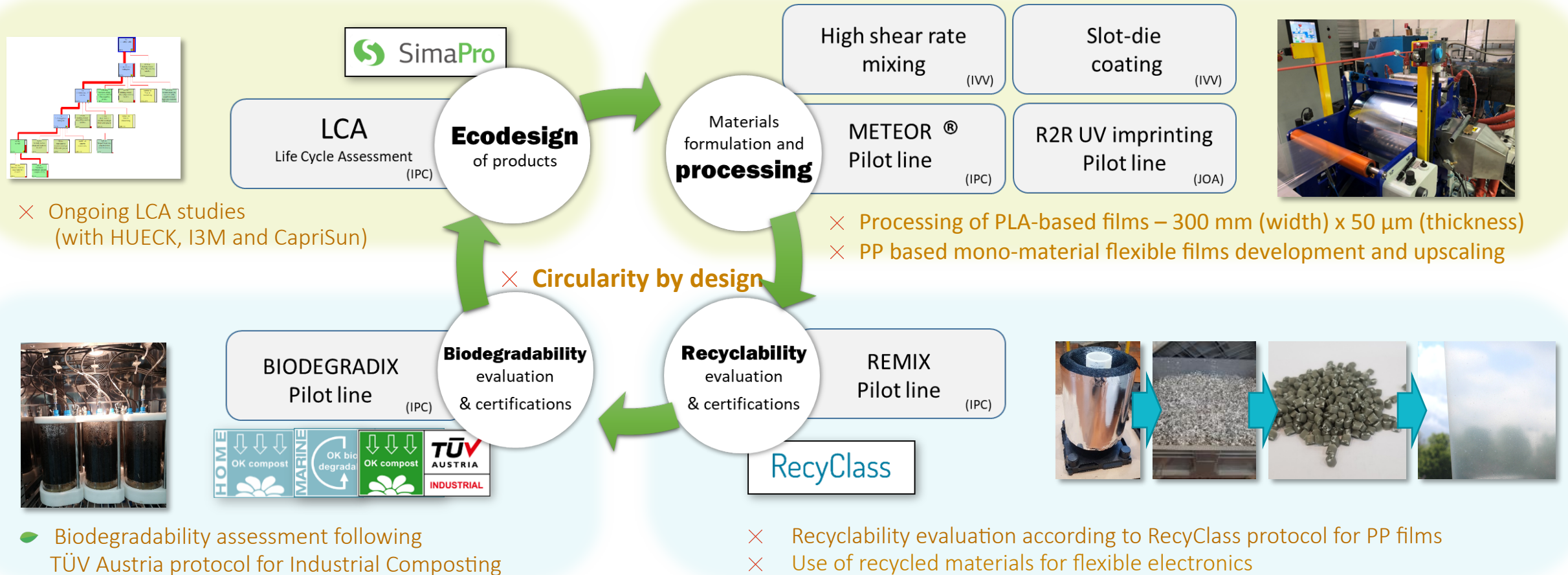
Status:

- Feasibility checks and mechanical design of all upgrades completed
- Prototypes developed, tested and improved
- Most upgrades in installation phase or installation will start soon
- Some upgrades: verification / validation is already ongoing



WP3 – Circular Economy of Plastics

Upgraded facilities and upgrading in progress



WP4: Characterisation & Verification Facilities

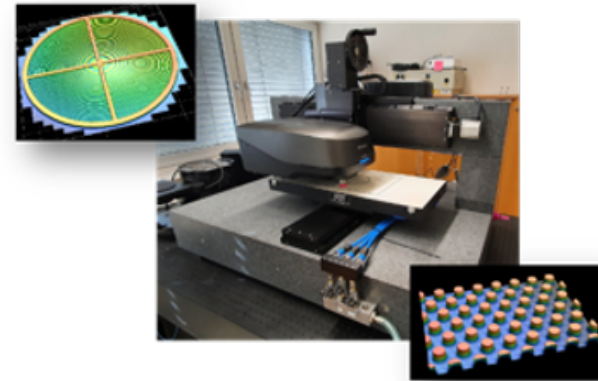


WP4 – Characterisation & Verification

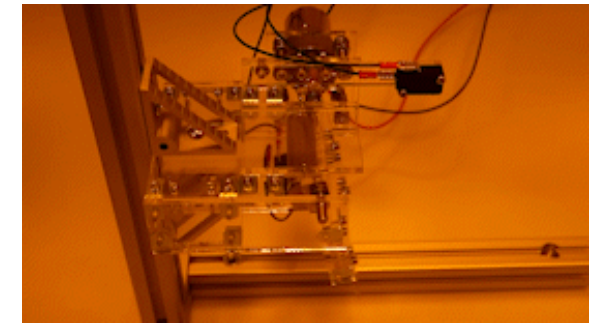
Catalogue of
physicochemical and
functional
characterization services



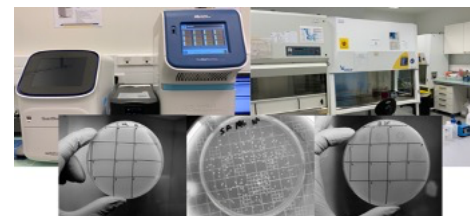
novel specialized characterisation @ FlexFunction2Sustain



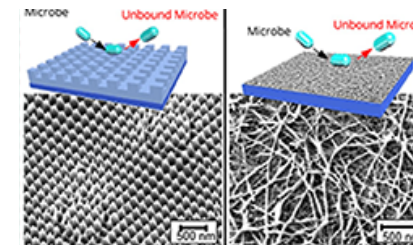
Large area (300 x 600 mm²) surface profiling
by 3D Confocal Laser Scanning Microscopy @ JOA



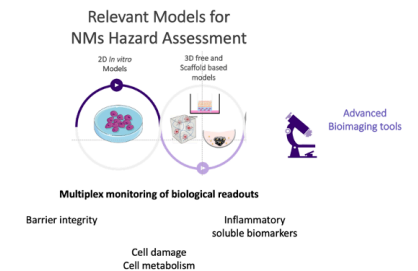
Combined optical calcium test for WVTR +
mechanical bending test in device geometry
@ FHG-IAP



Anti-COVID activity testing
@ INL



Upgrading Microbiology Labs
@AUTH and @INL for antimicrobial/
antifouling surfaces

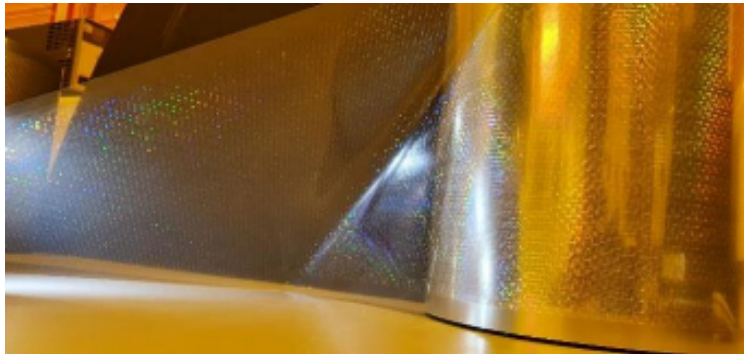


Workflows for safety and
compliance assessment –
ongoing

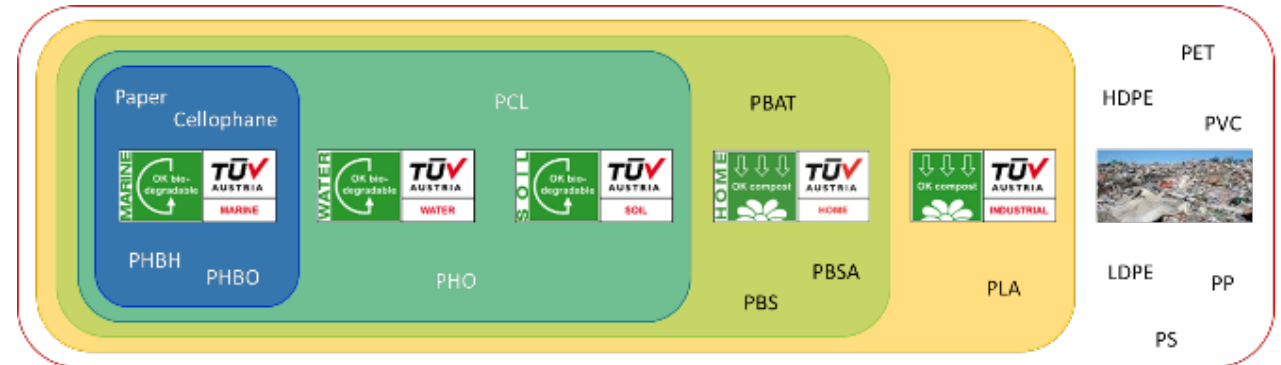
Catalogue available at:

<https://flexfunction2sustain.eu/wp-content/uploads/2021/07/Catalogue-physicochemical-and-functional-characterization-v1-F.pdf>

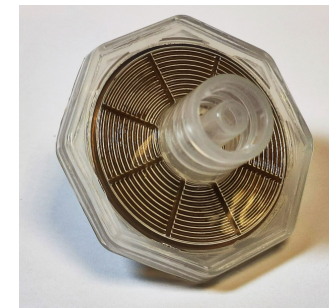
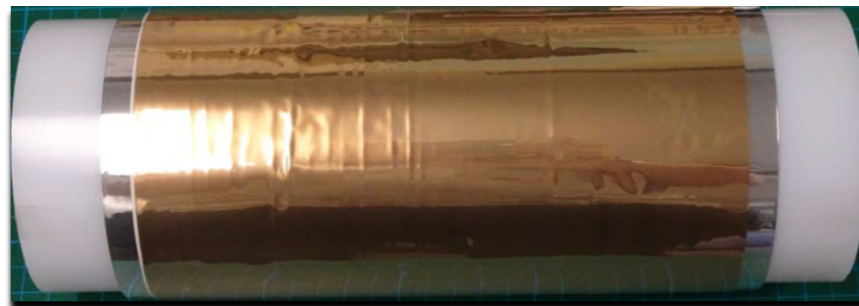
WP5 – Industrial Use Cases



5.1 HUECK Folien: R2R imprinting of bio-based UV resin on 70% post-consumer recycled PET for security labels

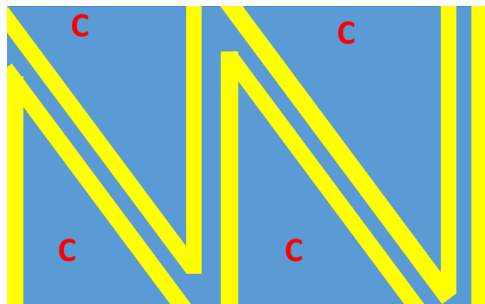


5.2 Procter & Gamble: Materials screening: most promising biodegradable polymer for the marine degradable shampoo sachets identified

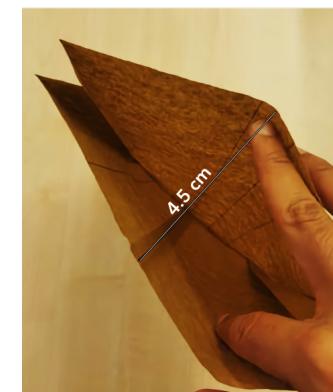


5.3 I3Membrane: Wrinkle-free Au coated PET membrane and integration of duplex Au coated membrane into syringe filter

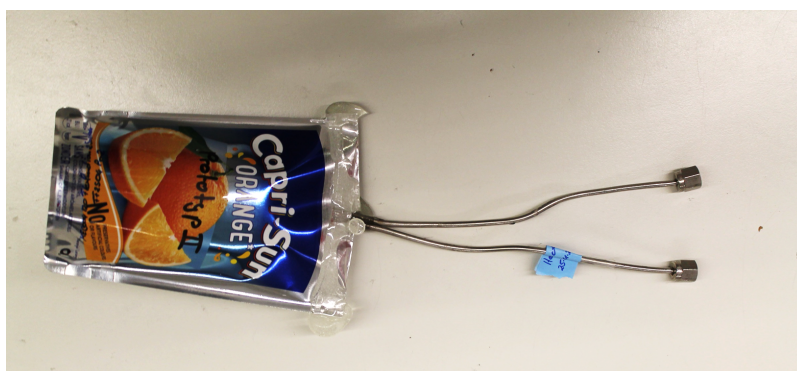
WP5 – Industrial Use Cases



5.4 Fiat Research Center - CRF: Design of the cover lenses structure for R2R laser scribing on ITO coated PET

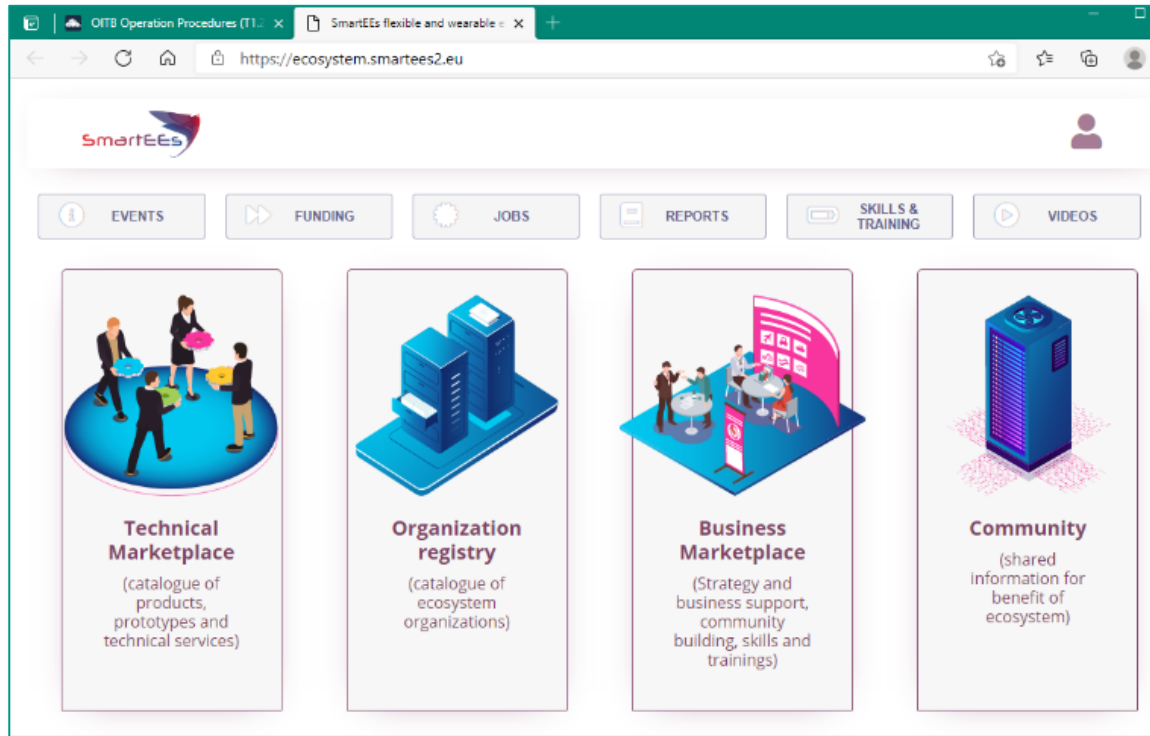


5.5 SONAE: Coating formulations (90% reduced water absorption) and ultrasonic spray process for paper coating developed. Packaging prototypes (bags) produced



5.6 Capri-Sun: Barrier properties (incl. O_2 permeability) on PP films investigated
→ select the most suited monomaterial for the recyclable drink pouches

WP6 – OITB Operation and Implementation (Starting in M18)

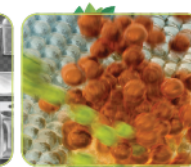


Ecosystem management platform (example from SmartEEs project - www.smartees.eu)

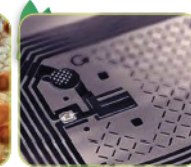
- **Ecosystem Management Platform**
 - ➔ database about network, services, community
- **Quality Assurance in Service Delivery**
 - ➔ increase efficiency and reduce liability risk
- **OITB ↔ Customer Relation Management**
 - ➔ targeted marketing and customer support
 - ➔ Contracts for Sales / Client Relation in Preparation
- **IPR and Innovations landscaping**
 - ➔ IP policy established (Del. D1.7)
 - ➔ Contracts with IP Database providers
 - ➔ IP Working Group established
- **OITB Service Portfolio**
 - ➔ Collect technical services for merging to OITB Catalogue
 - ➔ Maintain and readjust to market needs
- **Investor Relations**
 - ➔ Offer Finance Services to SME customers
 - ➔ first investor contacts established



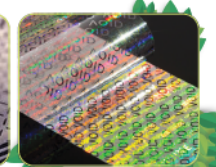
*sustainable
smart
packaging*



*surfaces &
membranes in
bio application*



*plastic and
paper
electronics*



*optical films
for security
and design*

Open Call for Pilot Case Projects

Why:

Access to all major
nano-functionalisation
techniques for plastic
and paper surfaces

Customized support
through a unique and
complete set of services

up to €130K
financial support

Who:

SMEs

Start-ups

When:

1st cut-off:

28 January 2022

2nd cut-off:

29 July 2022

3rd cut-off:

27 January 2023

Webinar:



**05 Oct 2021,
10 AM CEST**

Q&A:



**helpdesk@flexfunc
tion2sustain.eu**

WP8 Dissemination, Standardisation, Clustering

- Visual Identity and Dissemination of the Project and OITB Idea
 - Project Webpage & Dissemination Materials
 - FF2S in Press and Media
- FlexFunction2Sustain Events
 - Industry workshop on 21 Oct 2020 → ≈ 40 participants
 - Get in touch with innovative companies and future users
- Clustering with other OITB
 - Regular bilateral exchange: NGM, SNMT, NewSkin, MDOT.
 - 1st OITB Stakeholder workshop: 4/5/2021: ≈100 participants
 - 2nd OITB Stakeholder workshop planned: 2-3 Dec 2021
- Interaction with thematic associations and intermediaries
 - OE-A Working Group Encapsulation
 - EUPC, LINPRA, NanoSafetyCluster → EAB Members
- Standardisation and Regulation Activities
 - 6 standardisation projects with FF2S participation

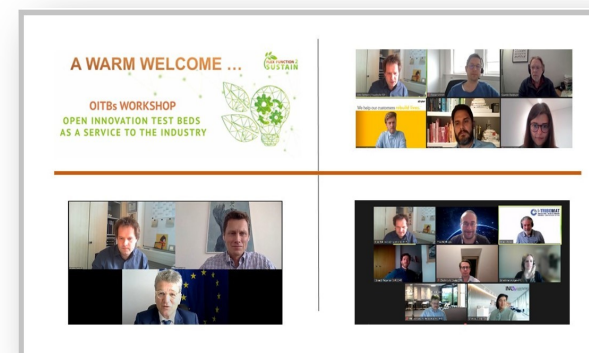
Project handbook



<https://flexfunction2sustain.eu/>



Events



Open Call promotion



Thank You !



Coordinator Contact:

Dr. John Fahlteich, Fraunhofer FEP, Winterbergstrasse 28, 01277 Dresden

Phone: +49 351 2586 136; E-Mail: john.fahlteich@fep.fraunhofer.de

<https://www.flexfunction2sustain.eu>



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