EUROPEAN DEFENCE AGENCY

Fact sheet

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Incubation Forum for Circular Economy in European Defence (IF CEED)

Project idea

MORPHISMS

Context

Personal protective clothing aims to provide protection to the user against hostile environments (thermal, biological, chemical, or other workplace hazards). Further improvement in circularity can be obtained from advances in design, including selection of materials, while maintaining the functionality.

Workers, either civilian or military, can be exposed to a multitude of potentially harmful environments while performing highly demanding multi-tasks that can cause serious injuries and resulting in illnesses.
Most systems are developed and obtained using materials and methods with high footprint, and without considering the end-of-life (disposal or recycling), thus contributing to the volume of landfills and environmental pollution.

Starting from the analysis need, sustainability of protective equipment can be improved from the design stage by:

- adopting a modular approach to the product.
- Developing safer alternatives to current materials and substances, implementing the 'Safe and Sustainable by Design' (SSbD) framework.

Objectives

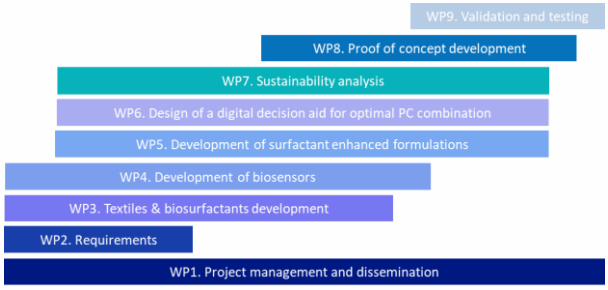
The stake for the defence sector is to develop smart textiles with new materials without downgrading the requirements.

The objective of MORPHISMS is to develop smart modular protective clothing system for military applications using "Safe-and-Sustainable by Design" principles.

The specific objectives of MORPHISMS are the following:

- Development of sustainable coloured textile structures
- Development of smart multifunctional textile structures (textiles with health monitoring (fatigue), chemical hazards sensing and antibacterial properties)
- Implementation of Handprint concept in the Life Cycle (Sustainability) Assessment (LC(S)A) process
- Design of a digital decision aid tool.

Methodology



Stakeholders

- Entities engaged in the IF CEED Project Circle “Circular Materials Textiles”.
- Industry, Research-and-Technology Organisations, Universities.

Timeline & Milestones

The foreseen project duration is 36 months.

- Requirements and relevant use cases defined (M6).
- Preliminary biosurfactants developed (M12).
- Biosurfactants and colorants developed using SSbD approaches applied in textile substrates (M24).
- Surfactants enhanced sensors for chemical detection and surfactants enhanced antibacterial properties developed (M30).
- Proofs of concept validated (M36).

Expected Outcome

Demonstrators:

- Textile substrate colored with biocolorants
- Smart textile substrate for chemical detection (color sensing, electrochemical sensing for high selectivity)
- Smart textile substrate with antimicrobial properties
- Demonstrator of smart textile system for health monitoring (fatigue).

Digital decision aid tool for selection optimal protective clothing system.

Services for implementation of SSbD and respective research lines.

Operational benefits

- Getting use of multifunctionality of textiles
- Increasing the flexibility of supply options.
- Improvement of personal soldier equipment.

Budget & funding

Type of project: collaborative project

Budget: EUR 10 000 000.