

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

### Project idea

# MICRAM – Mining critical raw materials from end-of-life military devices



### Context

Critical Raw Materials present, by definition, a risk on their supply. In addition to conventional mining in the EU, recovery of such materials from electronic (e-)waste offers additional sourcing options with reduced environmental impact.

Several materials are assessed as critical to their role in strategic technologies and the reliance of imports for their supply. One solution for some of these materials are to mine them from the soil, in the case they are available in Europe. However, this has a relatively high impact on the environment and may not be sufficient to provide the needed quantities.

Moreover, some CRMs have very low contents in most of ores, and mining is economically convenient in few cases. To spare natural resources, another way to obtain CRM is to mine them from the waste. This is particularly true for electronic devices, in which the presence of CRMs

is higher because of the need of performances, and the lower sensibility to supplying prices. The uptake of this strategy requires to develop disassembly - also considering opportunities for reuse - and recycling methods, with which materials can be recovered with the required purity and at a reduced cost. An innovative disassembly process is necessary to preserve elements to be reused and to reduce contamination in CRM mining.

### Objectives

MiCRaM (Mining Critical RAW Materials from end-of-life military devices) aims to open a circular economy approach to military electronic waste, allowing the recovery of critical raw materials (CRMs) from end-of-life military devices. In particular, CRMs from electronic systems are considered such as printed circuit boards (PCBs) or other complex electronic assemblies (screens, touchpads).

**The specific objectives of MICRAM are:**

- Providing a procedure to manage end-of-life military devices.
- Testing and re-using disassembled electronic components if still usable.
- Developing and implementing innovative disassembly and recycling technologies.
- Analysing the content of CRMs into electronic components.
- Evaluating the environmental impact of the new recycling strategy.

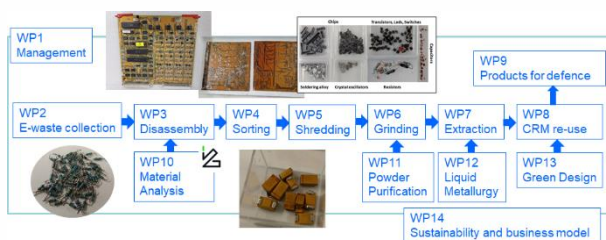
Besides technological advances to be developed in order to make recycling profitable, MICRAM will address logistics and information management linked to the handling of sensitive military devices.

**Work done for process feasibility:**

A team of EDA’s experts, joining the CRM Project Circle, has already done an experimental work to show the feasibility of the innovative process, from de-soldering to recycling. The content of some CRMs into traditional electronics has been also measured.

**Methodology and Timeline**

The MiCRaM project is broken into 14 WPs, over a time of 30 months.



**Stakeholders**

- Entities engaged in the IF CEED Project Circle “Critical Raw Materials”.

- Universities, Factories and Research-and-Technology Organisations.

**Expected Outcome**

Technological means and report on mining CRM from military E-waste:

- A detailed description of all the procedures and findings.
- Powders with high CRM contents, powders or scraps of such pure CRMs after extraction.
- Textile products with recycled CRMs.
- Pilot recycling installation (including de-soldering).

**Operational Benefits**

- Increase the security of supply.

**Budget & funding**

Type of project: collaborative project

Budget: EUR 3 000 000 – 7 000 000

(Depending on size of pilot installation).