

EDA CapTech Materials & Structures SRA



The European Defence Agency (EDA) Materials & Structures CapTech recently updated its Strategic Research Agenda (SRA) to align it with the Overarching Strategic Research Agenda (OSRA) methodology developed by the Agency. The technology gaps identified within the area of materials and structures have been expressed through ten Technology Building Blocks (TBBs). The TBBs have been prioritised and will be used to guide research and technology activities in the CapTech during the coming years.

Mission and objectives

The main mission and objective of CapTech Materials and Structures is to support Member States' Armed Forces with technological solutions to current and future challenges within the areas of **materials and structures**. The CapTech activities are guided by a shared vision of the available and emerging technologies developed by CapTech experts from government and non-government organisations, industry and academia. This vision is developed from state of the art analyses, identification of technology gaps and how these relate to current and future military needs. It is recognised that materials science and engineering are progressing rapidly, and that this opens new possibilities for military applications.

The work of CapTech Materials and Structures is generally in the range of starting Technology Readiness level (TRL) 2 to 4. However, the ambition for the TRL could go up to TRL 8 in specific cases. These two readiness level windows are necessary in order to close short term (5 – 10 years) and longer term (more than 10 years) technology gaps. A further CapTech objective is to create added value to European defence R&T by providing a forum for the generation of R&T collaborative projects in the materials and structures domain.

SRA update process

Based on future military needs expressed through the **Generic Military Task List (GMTL)** and the **EDA Capability Development Plan (CDP)**, as well as a state of the art (SoA) analysis of the area of materials and structures, a set of high priority **Technology Gaps (TGs)** were identified. Materials and structures are generic and relate to many diverse applications which are essential for all branches of Member States' Armed Forces. The TGs have been identified and **clustered by domains; land, air, maritime and cross-cutting**. The cross-cutting domain includes emerging and innovative materials and technologies relevant for more than one branch of the Armed Forces.

The updated SRA has implemented the new OSRA methodology for first time. As part of this, ten **Technology Building Blocks (TBBs)** have been established for the CapTech, clustering technologies and linking the TBBs to the TGs with a constant focus on military capability needs. The TBBs have been prioritised using a so-called "projectisation" methodology developed by the SRA Project Team. This allowed the TBBs to be prioritised both separately for each main domain (land, maritime, air, cross-cutting) and for the CapTech as a whole. Prioritisation by domain increases the value of the Materials CapTech SRA for the higher TRL system-level CapTechs.

The updated SRA has defined TBBs of different technical granularity and covering **two priority axes**. The first axis is defined through three "generic" TBBs relevant for all domains and application areas. The second axis is defined through seven application-oriented TBBs relevant for one or more of the four domains. The TBBs for each domain and for the CapTech indicate technology focus areas, and will guide the R&T activities in the CapTech for the coming years.

Technology Building Blocks (TBBs)

The following Technology Building Blocks have been defined for CapTech Materials and Structures:

- TBB01: Light Weight for High Performance Structures
- TBB02: Materials & Structures for Protection against Military Threats
- TBB03: High Temperature Materials
- TBB04: Camouflage and Signature Management technologies
- TBB05: Emerging materials for Future Platforms
- TBB06: Materials, Structures & Concepts for Platform Monitoring
- TBB07: New Manufacturing, Joining and Repair processes
- TBB08: Surface Engineering for Maximum Lifetime and/or Hostile Environments
- TBB09: Advanced and Smart textiles for Soldier Systems and Platforms
- TBB10: Computational Design and Materials Modelling

Way forward through “Projectisation”

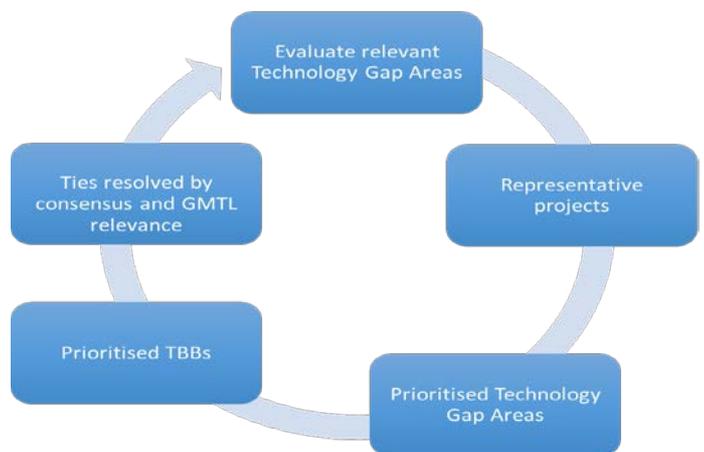
Materials and structures are essential for all branches of the Armed Forces, and similar technologies may be applied in many different platforms. This is peculiar to the Materials CapTech. To evaluate and prioritise technologies with such a wide range of diverse applications, the SRA Project Team developed a new methodology to identify, sort and prioritise the TBBs, both at domain level and for the whole CapTech.

The process is based on the principle that the state of the art (SoA) analysis should embrace the most relevant and high priority technology gaps (TGs), which in turn creates a basis for the definition of the technology building blocks (TBBs) and the analysis and prioritisation of them. To illustrate the relationships between the SoA, the TGs and the TBBs, two interfaces were developed: a) the SoA to TGs step, and b) the TGs to TBBs step.

The SoA was used for defining fictitious but realistic project concepts that will close a specific TG. The list of proposals was prioritised with respect to a) relevance of the technology to military operations (importance), and b) need for innovation in the technology (urgency), overall called a **“projectisation” process**.

In order to prioritise the TGs and TBBs, a scoring process at the level of the TG was implemented, and the total score for each TG thereafter transported to the TBB prioritisation through the TG-to-TBB interface. Thus TBBs that are most relevant for closing the TGs, i.e. those TBBs with the highest sum of TG points, are identified.

The last step of the process, a reality check helped to build consensus among the CapTech members (also taking into account the capability needs).



The schematic diagram illustrates the SRA process

High priority TBBs and CapTech activities

It can be seen that through the SoA analyses, TG identification, TBB creation, “projectisation” and the prioritisation process, the TBBs for CapTech Materials and Structures show two levels of granularity or priority axes. The first axis is defined through the three “generic” TBBs; TBB05, TBB07 and TBB10. These are relevant for all four domains and many different application areas. The second axis is defined through the seven application-oriented TBBs, relevant for one or more of the four domains; TBB01–TBB04, TBB06, TBB08 and TBB09. The relevance of the seven application-oriented TBBs naturally varies for the different domains.

The prioritised TBBs for each domain and for all the domains as a whole, are the essence of CapTech Materials and Structures SRA, and will act as a robust backbone and guiding roadmap, supporting the CapTech R&T activities in the coming years.