CWITP

COMPLEX WEAPONS INNOVATION & TECHNOLOGY PARTNERSHIP

27-28 October 2021

Acropolis, Nice, France

Press information

The CW ITP Conference 2021 in Nice, France is the first for the new programme. The intention to launch a follow-on programme from the Materials and Components for Missiles Innovation Technology Partnership (MCM ITP) was announced at the last conference in 2019. In April 2021, the UK's Defence Science and Technology Laboratory (Dstl) and France's Direction Générale de l'Armement (DGA) awarded MBDA a contract to lead the new partnership. This four-year contract for CW ITP will continue to build on the work of its predecessor carried out over the last 13 years, ensuring that Anglo-French generation-after-next missile technology remains at the cutting edge.

CW ITP

The vision of CW ITP remains to identify and develop novel, exploitable technology to enhance France and the UK's complex weapons capability for the 2030s and beyond.

Working collaboratively, CW ITP is looking for the revolutionary and the innovative and does this by:

- Identifying the key technology trends, capability improvements and potential disruptive technologies that will define generation-after-next missiles and complex weapons systems.
- Facilitating the maturation of technological innovations so that they are viable for future complex weapons acquisition programmes.

The CW ITP continues to fund the research of Anglo-French companies and Academia. However, its new framework will see it focus on five enduring technical areas (ETAs) identified as unique and critical to the field of complex weapons. A renewed group of French and UK companies, split equally across the two countries, will lead these ETAs.

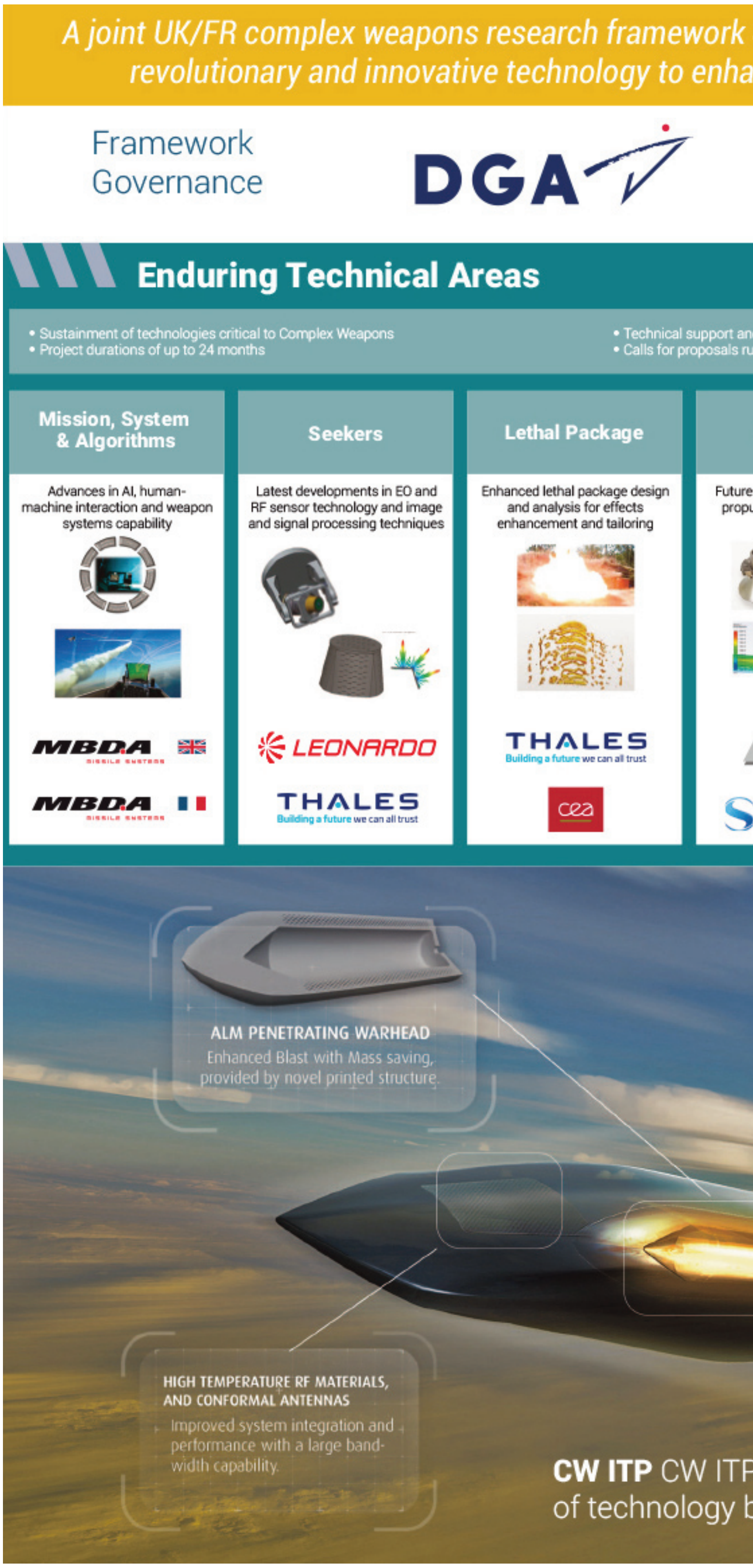
- MBDA for Material, Structure, Electronics and Mission Systems & Algorithms;
- Thales and Leonardo UK for Seekers;
- Safran and Roxel UK for Propulsion; and
- Thales UK and CEA (the French Alternative Energies and Atomic Energy Commission) for lethality.

The development funding provided by CW ITP in these areas will help sustain France and the UK's industrial and scientific base.

The new framework for CW ITP will also introduce greater collaboration across these areas through 'Dynamic Challenges' that will look at technologies with applications across them, as well as any new potential technology areas.

This year, the first ETA (Enduring Technical Area) Project Call started in early July for the CW ITP. Submitted proposals are aligned with the relevant ETA, but also a new Dynamic Challenge across all the ETAs dedicated to AI (Artificial Intelligence). The selection process for these projects has now entered into the scoring phase. Funding for the selected projects will then start in early 2022 lasting between one and two years.

Also new for CW ITP is its look to fund more 'Disruptive Innovation'. This is through short technology projects lasting between three to six



months. Whilst at the smaller end of funding, these projects carry a higher risk of not being successful, but a high reward if they are.

CW ITP has an annual budget of 12m euros – 50% from Dstl/DGA and 50% from Industry – to fund up to 30 projects every two years. Efficiency savings on costs of managing the projects has increased the funding to research activities. These research activities will focus on developing technologies with a low technology readiness level (up to TRL 3 or 4).

MCM ITP legacy

With CW ITP only launching its first call for proposals earlier this year, the biennial ITP conference in 2021 is a combined effort. It will showcase the legacy activities, research and success of the recent and ongoing projects within the MCM ITP, whilst also providing the platform to launch the next call for research and disruptor projects for CW ITP going forward.

Launched in 2008, the MCM ITP was a Dstl and DGA sponsored research fund open to all UK or French companies and academic institutions. It looked to identify and develop novel, exploitable technologies for next-generation missile systems in the 2030+ timeframe. It aimed to consolidate the UK-French Complex Weapons capability, strengthen the technological base and allow a better understanding of common future needs.

A consortium of industrial partners – MBDA, Thales, Roxel, Leonardo, Safran Power Units, QinetiQ and Nexter – led eight main technical domains; Systems and Navigation, RF Seekers, EO Sensors, Rocket Motors, Air Breathing Propulsions, Warheads, SAUs & Fuzes, Materials & Electronics. Each managed a portfolio of cutting-edge technologies, still at the laboratory stage, but holding the promise of major advances in the future.

Since its inception, the MCM ITP has conducted over 200 research projects involving over 150 different organisations.

When the new CW ITP contract was announced, MBDA CEO Éric Béranger said, "I am delighted that a new era of the Innovation Technology Partnership is beginning with this contract. MCM ITP was an excellent example of Anglo-French co-operation, and the CW ITP will no doubt continue in this endeavour."

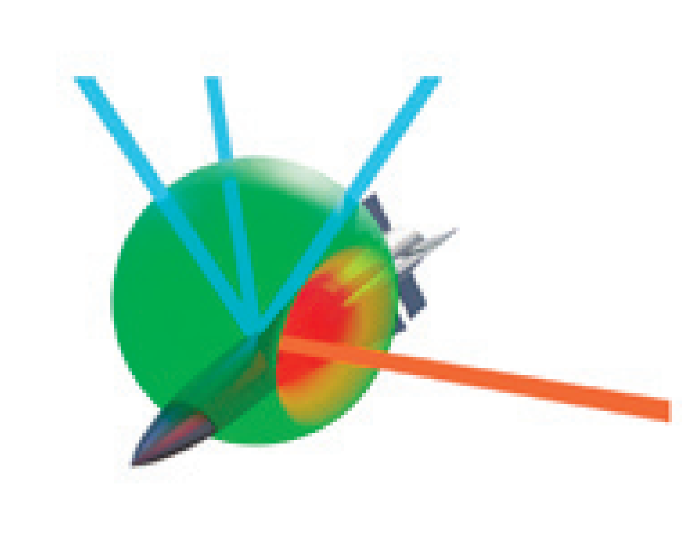
PARTICIPANTS

The MCM ITP leads the way in future missile systems technology development - it's growing fast. Here is a selection of our participating members.

Technologies to help reduce the size of future missiles

With the advent of Stealth technology on fighter jets, platform design has seen a shift to internalised payload bays. Added to this a need for a higher load out of weapons that can act together to tackle an increasing complex volume and level of threat in the battlefield, technology that contributes to being able deliver bigger and better effects from smaller calibre missiles will be of benefit to future complex weapons. Smaller will also be beneficial when arming the loyal wingmen and remote carriers or other attritionable adjuncts of future combat air systems. The following projects, funded by the former MCM ITP and being showcased at the first CW ITP Conference, demonstrate some of the technologies that could contribute to size reductions in future missile systems.

Novel Null Steering Antenna 2 (NNSA2)

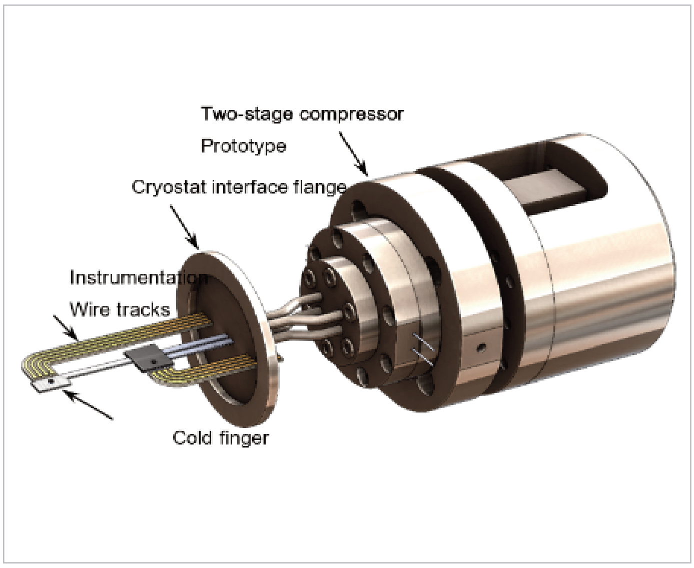


NNSA2 is the Development of a low cost / low mass ITAR-free GNSS anti-jam capability. GNSS is a key navigation technology for missile navigation. However, the threat to GNSS is exponentially increasing and GNSS Anti-Jam devices are essential for military and, increasingly, civilian applications. Current Anti-jam technology typically large, high in cost, consume lots of power and export controlled, and as a result often precluded from use on moderately challenging military applications, such as smaller calibre weapons.

The Advantage of NNSA2 is its Low size / low cost, whilst offering a capability where typical phased solution would be precluded e.g. in small and medium calibre missiles. It also has Fast detection of a jammer presence, followed by rapid deep null steering. As well as Continuous jammer tracking, with localization data provided to the operator for enhanced situational awareness

Based on specified MBDA requirements to ensure operational relevance, Swansea University are Developing a new Hybrid Microstrip Patch Antenna (HMPA) that can steer a null with an elegantly simple control board and software. The project is being supplemented by a rigorous testing regime, and will culminate in live GNSS Jamming trials.

Microcooler Technology De-Risking Phase 2

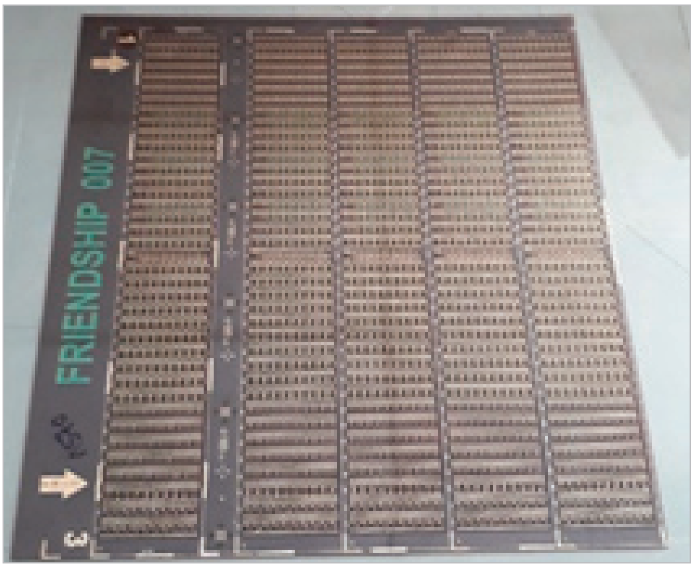


Recent advances in infrared detector technologies have allowed increases in the useful operating temperature of cooled focal plane arrays to approximately 160K. However, the coolers are based on existing open loop Joule-Thomson or Stirling cryocoolers, which drives the size, weight and power. This project is investigating the design and development of a miniaturised cascade Joule-Thomson cooler using MEMS based membrane compressors and heat exchangers.

This project is working on reducing the size, weight and power of an infrared detector cooler. In addition to advantages of reduced size, weight (helped as well by Lighter, and therefore less expensive gimbals) and power, there is also longer operating time, improved efficiency.

Leonardo, partnered with Absolute Systems and Inex Microtechnology, leads this project. This latest phase has concentrated on Optimising the heat exchanger design, Developing MEMS manufacturing process, Manufacturing prototype components and Assembling and testing the prototype heat exchanger.

POPE-II: Printed Organic Polymer Electronic



Missile electronics often require customized circuitry where even the most simple functions are expensive and use critical amounts of volume and mass. The recent emergence of bespoke OTFT (Organic Thin Film Technology) could provide an opportunity to create basic electronic systems in a flexible plastic film printed with conductive inks for signal routing and conditioning, health monitoring, sub-system verification, and even sacrificial circuitry. This project is testing the thermal limitations of OTFT, creating models and libraries for future designs, and experimenting with the potential use cases for the technology.

The adoption of such a technology could reduce the volume and mass of simplistic circuitry, provide positional freedom, remove the need for basic circuit cards entirely, or even allow circuitry in compact or complex spaces that were previously deemed impossible.

MBDA are partnered with experts at Durham University and CEA Liten in Grenoble to create several prototype designs using this new technology and theorise its future integration.

Novel Coanda Thrust Vector Control (TVC)

The aim of this project is to assess a novel approach to Thrust Vector Control (TVC) technology using the Coanda effect on a solid rocket motor guided weapon. The advantages of this technology would be a robust design due to a low number of moving parts, enabling it to be compact and therefore exploitable on small (e.g. 40mm) or large calibre weapons.

The project is led by Roxel, who are partnered with S&C Thermofluids. Together they are Generating a concept design and Conducting CFD analysis to demonstrate the feasibility of it, before Developing and manufacturing a prototype design for demonstration and conducting full-scale cold and hot gas firings to demonstrate performance capability.

MCM ITP

Materials & Components for Missiles
Innovation & Technology Partnership

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