COLLABORATIVE WORKING ENABLES THE MOD TO SUCCESSFULLY TEST LEADING-EDGE MISSILE SYSTEM

Continuous effort and commitment

Defence Equipment and Support (DE&S), QinetiQ, MBDA and BAE Systems worked together to plan and deliver a successful weapons trial for the UK Ministry of Defence, enabling the revolutionary new SPEAR Capability 3 missile to move into Detailed Design. The trial took place at the MOD Aberporth Range, managed by QinetiQ under the Long Term Partnering Agreement (LTPA).

QinetiQ is continuously exploring ways to develop its Test & Evaluation capabilities. Following a meeting between the MOD, QinetiQ and missile systems manufacturer MBDA, the Selective Precision Effects At Range (SPEAR) Capability 3 missile system was identified as a complex system which required evaluation of performance and maturity. Powered by turbojet engine rather than traditional rocket propulsion, SPEAR is planned as a new weapon for the F-35 Lightning II supersonic stealth fighter. Specifically, the SPEAR Airframe and Propulsion Demonstration trial would utilise LTPA resources, facilities and personnel, making project delivery extremely cost-effective and providing access to significant technical facilities and highly experienced personnel from across QinetiQ's entire business.

CREATING A NEW MISSILE SYSTEM

The project required a close working relationship between QinetiQ and MBDA, supported by the MOD, and a strong relationship with BAE Systems, who were responsible for the Typhoon launch aircraft and clearing the missile onto it. QinetiQ was contracted to support planning and delivery of a three-stage trial:

- Range work to confirm instrumentation compatibility and coverage
- Non-firing rehearsal: end-to-end dry run for all participants
- Firing trial: releasing the missile and monitoring performance along a pre-planned flight pathaturity. Powered by turbojet engine.

BENEFITS

- Close working relationship
- Significant technical facilities
- Highly experienced personnel
- Flexibility
- Cost-effective delivery
- "Can-do" attitude

"The QinetiQ 'can do' attitude and flexibility was absolutely key to the success of the trial. The QinetiQ answer was generally 'Yes it can be done... let's work out how to do it'. As a customer, that's exactly what I need."

ALAN SNELLING, MBDA

'EXCELLENT FACILITIES - A HIGHLY PROFESSIONAL TEAM'

"The LTPA meant we could access key subject matter expertise from across QinetiQ," says James Stockford, SPEAR Cap 3 Project Officer DE&S. "The LTPA also provided the option of a UK Air Range, saving the MOD a considerable amount of time, effort and funding compared to deploying to an overseas Range. The excellent facilities and highly professional trials team then enabled all trials requirements and objectives to be met." He draws attention to the "continuous effort and commitment" shown by parties.

Evidence from the trial helped the programme to move from Assessment into Detailed Design, with a £411 million contract awarded to MBDA. "The SPEAR trial is a good example of close collaborative working founded on open communications, and a flexible plan, resulting in a successful trial," adds Alan Snelling, MBDA. "QinetiQ was very flexible throughout, with the trial dates, work-up activities, clearances and documentation, with a general understanding that we all pushed as hard and fast as we could. I keep telling people about QinetiQ's 'can do' attitude."

CHALLENGES AND SOLUTIONS

The first challenge was working out how to perform the firing in the UK. An air-launched weapon, SPEAR engages land targets from relatively long ranges, requiring a Flight Termination System (FTS). MBDA wanted to create a novel FTS to restrict flight range while avoiding explosive breakup charges. QinetiQ worked with MBDA from early on to clear a method that avoided explosives, with QinetiQ Range advice influencing the detailed design. This early engagement was critical, influencing missile design to reduce trials risk.

Using the MOD Aberporth Range also meant air refuelling was unnecessary, while the trial would also benefit from Range capabilities, including Tracking, Marine and Air Surveillance Radar, Trials Control Systems, Telemetry, Data Centre and specialist personnel. "The QinetiQ team at Aberporth was a key factor in the successful conduct of the firing trial," says Paul Minion, MBDA. "The team at Aberporth was utterly professional, very flexible, responsive and accommodating. Quick thinking during the trial was key."

The other major challenge was timing prior to missile release, with only a short time window between the pilot committing and actually releasing. Getting this 'right first time' was critical to timely delivery of the project. If the missile was taken to the condition immediately prior to release but not released, re-conditioning meant a potential two-month delay. Only two missiles were manufactured for the firing trial. As a result, QinetiQ Range personnel worked closely with MBDA and BAE to develop a highly efficient firing sequence, which was rehearsed and tested multiple times.

SPEAR MISSILE RELEASE