



Press release

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DART Jet sets sights on revolutionising fast-jet flying training

World's first end-to-end jet trainer system is the fastest and most efficient and economical solution for fast-jet flying training



A brand new fast-jet training system is set to transform the delivery of next generation fast-jet pilot training and help revive the UK's overall aircraft design capability.

DART JET, the company behind the project, has a vision for an all-UK developed jet trainer system that will inspire and develop the next generation of UK engineers, scientists and designers. The project, known as DART, is an ambitious, but realistic and commercially viable whole aircraft development opportunity incorporating a wide range of engineering, IT, training and manufacturing technologies. DART JET aims to use the project to help protect the UK's critical whole aircraft and defence technology capabilities, whilst also boosting UK exports through answering a global need for new trainers from 2020 onwards.

DART JET will achieve this through developing 'DART', a family of trainer aircraft, specially designed to deliver the full breadth of fast-jet training capability in less time and at lower cost than conventional mixed-type trainer fleets.

DART JET's founder, Tristan Crawford, believes that with many existing training systems becoming outdated, there is a growing need for a comprehensive training system that meets the increasing capability demands of future fast-jet training, whilst also reducing the total costs of ownership.

Crawford believes that the UK's increasing focus on unmanned aerial vehicle systems, coupled with the nation's near total withdrawal from developing whole civil or military manned aircraft, has led to a decline of the UK's overall aircraft design capability, whilst other nations actively pursue a more balanced approach to manned / unmanned aircraft development.

DART JET believes it can help revive this capability by developing the world's first true family of trainer aircraft. Taking inspiration from the world of commercial aerospace, DART will use a common fuselage and centre wing with a family of outer wings and COTS & MOTS engine, systems and components to address both the Basic and Advanced / LIFT trainer market, whilst also reducing operating costs through high commonality of spares, maintenance and support across the entire system.

This fully integrated, yet flexible design architecture enables a single aircraft type to cover all phases of training from Basic, Advanced to LIFT (Lead-In Fighter Training) phases. Feasibility studies are still ongoing, but DART JET believes the concept has potential to reduce training hours, transition training, spares, maintenance and midlife upgrade costs by more than a third compared to conventional trainer fleets.

DART JET has brought together some of UK aerospace's top-level engineering and flight testing experts. The team has undertaken initial market research and completed over 3,000 hours of design development since 2010.

"There is a strong market need for more integrated, adaptable and efficient training to deliver the world's best pilots demanded by the world's most advanced fast jets," says Crawford.

"Currently, basic and advanced training systems have little commonality and revolve more around the aeroplane than the evolving needs of students and operators, which hinders training progression and increases dropout rates. With different cockpit architectures, procedures, maintenance and spares from one aircraft type to the next, the transition is time-consuming and costly. Whilst advanced turboprop trainers provide an economical single-type solution, these tend to be harder to master in basic training and don't deliver true LIFT performance."

The modularity of DART JET's training system is based on what the student and the operator require to achieve the quickest and safest route to an operational conversion unit (OCU) to fly a front-line, fourth or fifth generation fast jet.

Central to this is a common Mission Management System (MMS) that follows the student throughout Basic and Advanced training. The MMS is the student's interface with all aspects of the training and mission environment, including the aircraft itself.

Student and instructor work together to tailor the training, display environment and functionality to meet the customers' latest operational needs. Delivered via a tablet that interfaces with both ground-based training systems and the aircraft itself, the system also offers complete flexibility to train anywhere. The MMS also allows instructors to 'flex' the training and decide the order in which training modules are presented to suit better the strengths and weaknesses of each individual student. This gives instructors more control to reduce the number of students failing the course as it is delivered.

Inside the aircraft, DART's core feature is the cockpit interface. Learning to use the cockpit seamlessly is critical to delivering a successful training mission in the aircraft and for training students to acquire the correct display monitoring habits and selector reflexes when it comes to flying more complex aircraft later on.

Centred around the most advanced fast-jet cockpit environment, DART JET has therefore made the single-piece, full glass cockpit display fully configurable to mimic most frontline combat aircraft types. With 90% commonality of cockpit layout, checklists and handling between both Basic and Advanced aircraft variants, DART's priority is to make the system revolve around the needs of operators and student, enabling faster and smoother training progression, reducing dropout rates and delivering the full spectrum of Basic, Advanced and LIFT training necessary to prepare pilots for tomorrow's advanced fast jets.

DART's flexible airframe design is achieved through two key elements; firstly a self-contained engine and air intake 'pod' optimised to accommodate a customer's engine of choice, whilst not requiring any re-design of DART's common fuselage. DART JET has filed intellectual property on this aspect of the aircraft's design. Second is the ability to assemble the aircraft with either a basic or high performance wing. This ability to tailor the choice of engine and wing combination during manufacture and assembly - without large-scale re-design of the aircraft or wholly separate jigs and tooling - allows DART JET to drastically reduce the costs of airframe design and development.

Once manufactured, the different DART variants remain as built, owing to the certification cost and operating risk of interchanging wing or engine modules in service far outweighing any benefit this additional flexibility might bring to customers.

This common aircraft configuration across a mixed fleet of Basic and Advanced / LIFT trainers gives operators a massive advantage in maintenance training and spares commonality compared to mixed fleets. An independent feasibility study is in progress to confirm the potential savings, however DART JET currently estimates that the total lifecycle cost of maintaining its Basic and Advanced training system will be at least a third less than traditional mixed fleet systems.

For pilots in training, shared features including common cockpits and a common aircraft configuration allow for earlier downloading of OCU mission and systems training, which in turn allows students to spend more time during the Advanced course focusing on LIFT training.



Cockpit variants

“Existing basic and advanced trainer designs are ageing and over the next ten years many will need to be replaced to support the increasing capability and cost demands of future fast-jet training,” added Crawford.

“The UK’s own Red Arrows fleet of Hawk T1s will come to the end of their life in the mid-2020s, but MoD will be challenged to secure an affordable new aircraft replacement for the ‘Reds’ that is also worthy of showcasing the best of British aerospace engineering. With new advanced LIFT trainers becoming too high-end and expensive for many customers working with reduced budgets, many nations are starting the process to replace their trainer fleets wholesale and are looking for a low-cost, end-to-end training system. Even those who have

recently selected traditional trainers are still looking for ways to extend their training service offering to overseas and partner airforces, but using more cost-effective platforms.”

DART would enter service in the early 2020s to serve a recognised £100Bn market for low-cost basic and advanced trainers.

“DART answers the UK Government’s call to 'think big',” added Crawford. “It will support the Government’s target to create two million new jobs and three million apprenticeships in the next five years and to double exports to £1trillion by 2020. Investment in STEM (Science, Technology, Engineering & Mathematics) is crucial to achieving these targets.

“This project will create great opportunities to train and develop our engineers and apprentices in a broad range of defence and aerospace-critical skills in answer to the call to double engineer training to 180,000 per year. DART JET estimates that such a project will generate 4,000 direct and indirect new jobs in the UK, as well as new export revenue in airframes, engines and integrated avionics and training information technology. Importantly, it will establish a much-needed high-appeal aerospace project that engenders a great sense of pride, as is befitting of the home of the world-renowned Red Arrows, who represent excellence in not only military flying, but also the UK aerospace sector’s ability to produce superb jet trainer aircraft.”

In order to deliver this next generation fast-jet training solution for 2020, DART JET is currently undertaking independent market and lifecycle cost feasibility studies and is now seeking investment and industry partners to enter an exciting new phase of detailed design and engineering development.

To find out more, visit DART JET at Pod 24, Midlands Aerospace Alliance (MAA), UK Pavilion, Hall 1 at the Farnborough International Air Show 11th – 17th July 2016.

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For further information on DART Jet, please visit www.DARTjet.biz or email: info@DARTjet.biz.

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Issued on behalf of DART Jet by JDPR.

Notes to editors:

DART Jet

DART Jet is a UK-developed family of trainer aircraft that shorten pilot training and reduce customer operating costs.

The DART concept was initiated by Tristan Crawford (MSc Aerospace Vehicle Design, Cranfield University, 7 years in R&D at Airbus, 2 years at QinetiQ on Military Aircraft testing, 4 years in Aerospace Sales).

Defence Skills

- UK needs to create 2 million new jobs and 3 million apprenticeships
- UK needs to double engineer training to 180,000 per year
- Excluding Taranis & Sabre, there are currently no new British high-appeal aerospace projects
- Need to increase focus on 'Pride' projects (F1, Bloodhound, Red Arrows), to accelerate collaboration between Aerospace and F1 Technology
- 'Whole System' projects protect a broad range of skills

Exports

- Conservative Government desires to double exports to £1Tr by 2020
- Achieve this by investing in STEM and urging UK entrepreneurs to 'Think Big'
- HM Govt could make strategic investments which benefit UK-wide Defence and Aerospace corporates over the next 25 years
- With respect to UK Aerospace, examples of focussed investment could be Skylon, an additional squadron of Tranche 3 Typhoon, accelerated purchases of F35B and two DART Flight Test aircraft with provision for follow-on production, non-London industrial UK being the main beneficiary