

UK Rapidly Developing New Drone Programmes: “Mosquito” and “Swarming”

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While the primary focus for UK military drone operations has been around larger systems like Reaper, the forthcoming ‘Protector’ and Watchkeeper; the UK is increasingly funding the development of smaller drones to engage in war-fighting roles.

Mosquito

At the International Air Tattoo at RAF Fairford in late July, the MoD announced that through the RAF’s ‘Rapid Capabilities Office’ it had awarded contracts to three companies/consortium to develop [a new type of unmanned drone under a project named ‘Mosquito’](#). Blue Bear, Boeing, and Callen-Lenz have 12 months to design a ‘remote-carrier’ or ‘loyal wingman’ type drone that could accompany the UK’s Typhoon, F-35 or FCAS/Tempest aircraft. Flight [reported](#):

Following a one-year development phase, at least one bidder will be selected to build and fly a demonstrator, says Peter Stockel, innovation autonomy challenge lead at the UK’s Defence Science and Technology Laboratory. “Our aim is to get something in the air before 2023”.

The concept of a ‘loyal wingman’ drone is to fly alongside or slightly ahead of military aircraft and to work in conjunction with that aircraft to undertake various tasks, such as surveillance, electronic warfare (i.e. jamming radars), laser guiding weapons onto targets, or even to carry out air-to-air or air-to-ground strikes. US companies [Boeing](#) and [Kratos](#) are already developing these types of drones, although they are far larger than the one envisioned by the Mosquito programme. Rather than being directly controlled, this type of drone flies autonomously sharing data and information via the main aircraft. This appears to be the drone project that Gavin Williamson suggested in February – to much [bemusement](#) – would be deployed by the end of this year. While it involves multiple drones, it is not a ‘swarming drone’ as such.

Drone swarms squadron to be formed

However, related but separate from the Mosquito development project, the MoD is developing its work around swarming drones (that is, 10 – 20 or more small drones acting in concert). While much of this work is taking place behind closed doors, the outgoing Chief of the Air Staff, Stephen Hillier, [told](#) the Air and Space Power Conference in July:

“For our swarming drones programme, if we had set about this 3 years ago in a traditional acquisition route we would not be where we are today. The Team

were set the most challenging objectives and I am confident enough to say the results, thus far, are looking pretty impressive. So much so that I can declare that we will shortly be forming an Experimental Sqdn - Number 216 Squadron - to bring this capability quickly to the frontline."

We can get a glimpse of what is being developed through some of the work that MoD has been funding over the past few years. In 2016, the MoD launched its '[Many Drones Make Light Work](#)' competition. The competition document stated:

"we want more than 10 UAS to operate in a co-ordinated and closely coupled way to achieve military effect across the electro-magnetic (EM) spectrum (in other words ranging from visible frequencies through to low frequency radio waves), in a contested environment, and all managed by a single operator."

Companies and universities were invited to submit ideas that would enable swarming drones for "missions in complex urban and littoral environments" such as "tracking individuals; tracking vehicles; area mapping; area surveillance and communications relay."

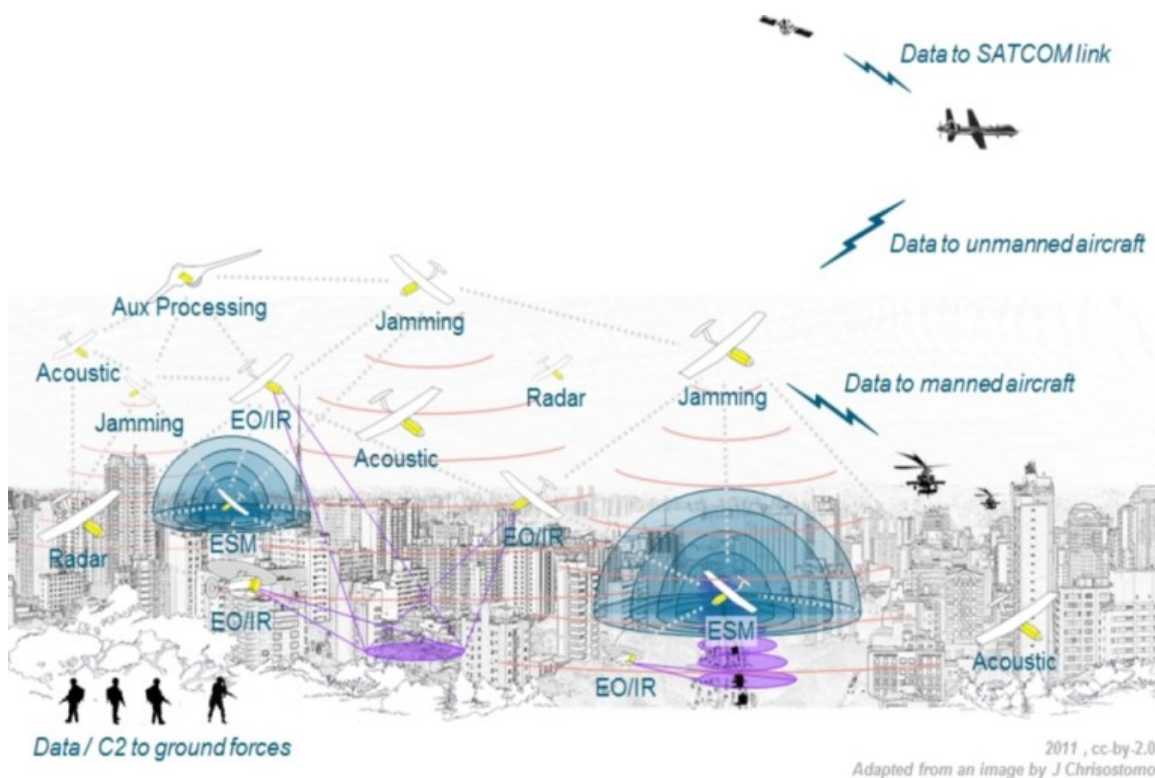


Image from 'Many Drones Make Light Work; competition document

In March 2019, the MoD awarded [further funding](#) under the programme to a consortium of companies led by [Blue Bear Systems](#) (who are also one of the bidders for the Mosquito programme detailed above) with [IQHQ](#), [Plextek](#), [Airbus](#) and the [University of Durham](#). Managing Director of Blue Bear Systems, Ian Williams-Wynn said:

"The ability to deploy a swarm of low-cost autonomous systems delivers a new paradigm for battlefield operations. During this project we will deploy next generation autonomy, machine learning, and AI to reduce the number of operators required, the time it takes to train them, and the cognitive burden on any operator during active operations. This allows very complex swarm-based

missions to be performed simultaneously against single or multiple targets in a time sensitive and highly effective manner.”

This funding, says the [MoD press release](#) is to enable a group of 20 drones to be more “self-sufficient ... providing the military with the ability to operate in increasingly complex and contested environments.”

For humanitarian purposes (*wink*)

The MoD, though its research arm, [DSTL](#), has also been working in conjunction with the USAF [Air Force Research Laboratory](#) (AFRL) on drone swarming technology. In March 2019 they jointly organised and publicised a ‘[Drone Hackathon Challenge](#)’. DSTL said

“We are reaching out to industry, academia, tech start-ups, coders, anyone with new ideas and an interest in drones, artificial intelligence or autonomy to help us find and develop new concepts of controlling drones in the most efficient and effective way....”

The end of that sentence went on “to give as much assistance to the emergency services as possible.” The exercise will, said the press release “explore innovative ways to plan missions using multiple systems to assist in the identification and prediction of how wildfires will spread and subsequently find preventative solutions, minimise damage and save lives.”

However, while the event was framed as helping emergency services to use drones to control wildfires, the reality is the two powerful military research laboratories were keen to draw in researchers in universities and elsewhere who would not want their work used for military purposes. Mick Hitchcock, senior technology adviser for AFRL let the cat out of the bag when [interviewed by Air Force Magazine](#):

“The challenge is focused on a humanitarian mission, but in reality, the learning applies very well to ... Air Force interests.”

As the magazine reports:

The idea came about last spring when representatives from the UK’s Defence Science and Technology Laboratory visited the Wright Brothers Institute in Ohio. At the time, wildfires were ravaging California, and another wildfire had just caused significant damage in the UK. By making it a humanitarian challenge, the two labs were able to reach out to nontraditional small businesses and universities “who may not want to play on a military mission,” Hitchcock said.

Danger of Drones

Research work by the MoD to develop and deploy unmanned systems incorporating AI and autonomy is now expanding rapidly. Our report, [Off the Leash: The development of autonomous military drones in the UK](#) published last year, set out the background and many of the dangers of marrying drones with autonomous technology, including unpredictable behaviour, loss of command and control, ‘Normal’ accidents and the inevitability of misuse.

By co-incidence, this week, the Defence Select Committee is taking more evidence for its inquiry, '[The Domestic Threat of Drones](#)'. The committee is looking at the danger created within the UK as (ahem) "ever-more advanced drones have become readily available." While the danger is posed as arising from 'bad' use of the technology by others (in this case, terrorists and extremists maliciously using drones within the UK), perhaps it's time to address the fact that this is an inevitable by-product of the development and growing use of unmanned systems for military purposes. While many continue to balk at the idea that the technology itself is problematic, both the vertical and horizontal proliferation of drone technology is a danger to global peace and security.

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