The Benefits, Challenges and Evolution of Unmanned Combat Air Vehicles

Interview by Helen Winsor, **Defence IQ**

Wing Commander Chris Thirtle of the Royal Air Force speaks to Defence IQ about the future direction of the use of Unmanned Combat Air Vehicles.

Defence IQ: Hello and welcome to this podcast presented by Defence IQ for the Unmanned Combat Air Vehicles Conference 2010. The event will explore the existing and future potential of weaponised unmanned air platforms. I'm your host today – Helen Winsor. I'm very pleased to be joined by Wing Commander Chris Thirtle who is in charge of Air Staff Strategy for UAVs at the RAF. Chris, good morning. Thanks very much for sharing your time with us today.

WC Thirtle: Good morning.

Defence IQ: So, to start off with, what would you say is the future direction for the use of UCAVs in the RAF?

WC Thirtle: I think from that perspective, obviously defence capability requirements are informed by government policy and as we're currently in a Strategic Defence and Security Review, I couldn't predict what the future requirements might be. However, in my opinion, operations in Afghanistan have demonstrated a clear utility for armed intelligence surveillance and reconnaissance platforms, such as the General Atomics Reaper which the Royal Air Force operates. So I think, looking to the future, we can see a situation where those kinds of systems are going to have utility in other scenarios, so we'll be looking to investigate that further. And equally, preliminary studies have indicated future benefit in more advanced systems, looking 20 years hence into the combat air side of capability, and again there's interest in that, but obviously I can't pre-suppose any of the outcomes of the security and defence review.

Defence IQ: Although today you describe these aircraft as 'remotely piloted', will they ever be truly autonomous, do you think?

WC Thirtle: In my opinion, it's not difficult to envisage a situation, particularly early on in a total war scenario where a remotely piloted air system has sufficient autonomy - the ones programmed with route and target parameters and location of that target. It could fly itself there, identify and attack it, very much like a pre-programmed cruise missile probably could today. However, there are more scenarios across the spectrum of conflict where I believe such an attack would not be considered acceptable and so, to ensure the versatility of remotely piloted air systems across the spectrum of scenarios, we have to meet legal requirements applicable to the law of armed conflict. I believe it's likely to remain an enduring requirement that any future aircraft, regardless of how autonomous it could be in conducting attacks, for an appropriately trained person to be able to monitor and, if necessary, intervene in that attack and apply, really, human judgement to determine and ensure that it's proportional and it's in accordance with wider acceptability and the rules of engagement. So, the summary would be that an autonomous system may be able to determine in the future if it could make an attack, but there are certain scenarios where you can envisage that a person would be required to not just determine whether it could be attacked legally, but whether it's appropriate that it should be attacked at that moment in time.

Defence IQ: Can you tell us about the core benefits of using remotely piloted aircraft operationally - as they say, the dull, the dangerous and the dirty?

WC Thirtle: Really, again, it comes down into two areas. There are the benefits of persistence or endurance of the platform that delivers a persistent effect on operations, and obviously if the crew are not within the aircraft and the aircraft has a long endurance capability, it allows mission durations beyond that which would be considered tenable for a manned aircraft - the remote crew obviously being able to rotate on the ground through a shift system whilst the aircraft is airborne. This will help maintain their focus and their concentration over extended periods of time, which, just by human nature, would start to tail off and we wouldn't want to do that in operations. So, if you were going to have enduring sorties, then being able to rotate the crew has obvious practical benefits.

And persistence gives us the opportunity to observe an area over a prolonged period of time, build up the pattern of life of what's going on and, if that platform is also armed, should a fleeting target present itself, it gives us an opportunity to reduce that sense of a shooter timeline to actually affect that target and hence being there persistently is very useful.

Looking towards the hazardous, I see this in two senses, personally. Both are related to survivability, one more so of the platform inasmuch as it can operate in high-threat areas in terms of an opposition's air defences, aircraft or surface-to-air missile systems, but also its ability to prevent a hazard to the crew, inasmuch that if they were in that aircraft in that threat environment, they might get shot down, but also hazards to the crew from effects that can be in the atmosphere, be they chemical, biological, radiological hazards and that kind of thing. And survivability of the platform really in both situations can be enhanced by flying it remotely through either increased platform performance - being able to manoeuvre it in degrees of acceleration beyond which you would wish to expose a human to - and also the design of the platform itself is less constrained by the fact it doesn't need to have a pilot within it, so it can maybe be smaller, be lighter, be a novel shape which will endeavour aid that survivability.

Defence IQ: What do you see as the most realistic roadblocks stopping RPA becoming more pervasive?

WC Thirtle: The future air and space operational concept, that is one of our doctrinal documents in the Royal Air Force, notes that remotely piloted air systems should be accepted on the basis of their capability, so they have to earn their route in the Force. Current systems, such as Reaper, do this by virtue of that endurance that we just discussed and the persistence it provides on air operations. However, this is a system that was procured as an urgent operational requirement for a specific scenario that we knew we were in, so in my opinion the roadblocks are in developing this technology to the point where it is proven as survivable, as versatile, adaptable, and flexible as a current manned combat aircraft. At the moment, the technology constrains it to certain environments and we tend to have our forces set such that we can respond to any situation and, at the moment, a remotely piloted air system is constrained in doing that, one of the key things being its ability to integrate within civilian airspace, which would potentially limit its deployability and its utility, and also in its advisability in looking towards a future conflict and future threat environment. So these would need to be addressed first before they would become more pervasive within the Force mixes.

Defence IQ: Can you explain a little about the implications of pilots flying RPAs who have not undergone what might be considered traditional RAF pilot training? Also, could you talk a little about the implications that this has to RPA development?

WC Thirtle: I think the key thing here is to remember that remotely piloted air system pilots will always be appropriately trained for the role that they have to perform. The Chief of Air Staff said at the recent RAF Air Power Conference that remotely piloted air system crews will be as well trained and as equally skilled as pilots of current aircraft, but their skills in some aspects are likely to be different. The RAF is working currently to understand better what is that correct skill set that individuals require to do the task and to be able to discharge responsibilities that they will have on them.

At present, remotely piloted air systems such as Reaper were procured, as I said, as an urgent operational requirement and therefore the only method we had of providing crews in time was to use those with previous flying experience from other aircraft types. As our experience of those operations grows, we're becoming much more aware of what a future training system might look like, but I think the key thing to remember is they will be appropriately trained and skilled for the job that they're going to do. When you look to how that might translate into the systems themselves, then we would obviously be looking to reduce the workload of the individual in actually operating the aircraft specifically, but also in flying it and keeping it airborne and getting it from A to B, and much more allowing the individual to focus on what the senses, what the capabilities and the payloads the aircraft are doing, and therefore manipulate that information to operational effect.

Defence IQ: At what point do remotely piloted aircraft hold sufficient capability that they become part of the Force mix?

WC Thirtle: I think there's an argument that says that actually they already are part of the Force mix, as Reaper is already deployed on current operations in Afghanistan where it's proving that a remotely piloted air system and piloted combat aircraft like the Tornado when employed together make a highly effective and complementary Force. But, as I mentioned earlier, their future within what we call the contingent Force mix, ready for any foreseeable future conflict or use, comes from not only demonstrable capability to include that versatility and survivability across the spectrum of conflict, but also they have to be affordable and cost effective through life when you consider them against a piloted alternative. So they need to be a value-for-money argument as well.

Defence IQ: Finally, what do you think can be gained from attending our UCAV Conference and how might it help people within the Forces and across industry deliver the best practice for manned and unmanned platforms?

WC Thirtle: I think a conference like Defence IQ's UCAV 2010 really helps. Industry and defence departments need a close working relationship and conferences increase that dialogue, facilitate that dialogue and enable other interested parties to inform the debate that is ongoing - and we can look for those opportunities to either work together collaboratively and therefore it's a valuable opportunity for all engaged in the field of UCAV development.

Defence IQ: Well, we'll have to end it on that, but I'd like to thank you again, Chris, for taking the time to talk to us today. It's been a pleasure speaking to you.

WC Thirtle: It's been fantastic. Thank you very much.

There's still an opportunity to be part of the UCAV Conference 2010. You can book your place at the event which is going to be held at CCT, Canary Wharf, London, between 13th and 14th July. If you're interested, you can email us at enquiries@iqpc.co.uk or call our free phone line on 0800 652 2363.