



FUTURE AIR POWER EQUIPMENT TRENDS

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It has been reported that the UK's Taranis unmanned autonomous drone, touted to be the most advanced flying machine ever designed and built by the UK "carried out successful test flights at an undisclosed location, believed to be in the Australian desert, in August last yearⁱ. "The Taranis was built by BAE Systems, Rolls Royce, GE Aviation and QinetiQ, alongside the British Ministry of Defence (MoD) military staff while being funded by the British Government and defence industry. The Taranis was first unveiled in 2010 by BAE but has been kept under wraps since then. The group managing director of BAE Systems, Nigel Whitehead, has called Taranis the "Pinnacle of British Engineering" while the minister for defence equipment support and technology, Philip Dunne, has called it "the most advanced air system yet conceived, designed, and built in the UK". Details of the planned performance figures of the Taranis have not been made known. The flight envelope achieved in the flight tests till date has also been kept under wraps. However, test pilots involved in Taranis' testing have stated that the craft achieved a perfect take off, flight and landing autonomously and the flight envelope aims towards performance in speed of at least twice as fast as other Unmanned Aerial Vehicles "UAVs", also called Remotely Piloted aircraft (RPA), in service todayⁱⁱ. The Taranis is likely to achieve supersonic speeds in its developed version.

Developments in Advanced UAV Technology

Taranis is just one of several known similar programs under development in the world. The US is progressing development of the X-47B. The X-47B has achieved major

milestones in demonstrating autonomous take off and landing from aircraft carriers. This is an astounding achievement considering that the X-47B carried out these flights from aircraft carriers with no man in the control loopⁱⁱⁱ. France is developing the Neuron Unmanned Combat Air Vehicle (UCAV)^{iv}, while China carried out the first flight of its “Sharp Sword” UCAV in 2013^v. India’s DRDO is known to be working on its Autonomous Unmanned Research Aircraft (AURA)^{vi}.

These myriad UCAV programs have a few striking similarities. All these programs feature jet powered tail less flying wing designs with stealth features such as air intakes on the upper surface, serpentine intake tunnels, internal of semi-recessed weapon carriage etc. Moreover all these are planned to operate autonomously with no remote pilot controlling the machine as is the case with the currently in service UAVs and armed UAVs such as the “Predator” and “Reaper”. These programs have generated a debate on the ethics of designing machines with the ability to kill personnel with no human in the loop to take a decision of the release of weapons. The UN has called for a ban on all such autonomous technologies^{vii}. Such calls, going by the history of development and deployment of new war fighting weapons in the past, are likely to have little effect on development and deployment of such technologies. Thus it is prudent for all countries that are able to develop the required technologies. The DRDO effort with AURA should be seen in this context even if no QSR currently exists from the Indian armed forces for such a platform.

The Manned versus Unmanned Debate

The arrival of these programs on the aviation scene has also stirred a debate on the future of air power in the context of manned vs. Unmanned. This debate is reminiscent of the debate on the 1950s and 1960s when it was opined by very authoritative people that the English Electric “Lightning” would be the last manned aircraft built by the UK in view of the arrival of the “missile age”^{viii}. The UK cancelled its proposed TSR2. fighter project at the same time^{ix}. In a similar vein the USA estimated that with fielding of the new guided air-to-air missiles (AAMs) the aircraft mounted gun or cannon had no place on fighter aircraft and designed fighters with only missile armament, most notably on the McDonnell Douglas F-4 “Phantom-II” to later go in for retro-fitting gun packs on these same fighters in view of

actual combat experience^x. At these times the new “game changing” weapons talked about were far from mature. The missiles of the 1950s and 1960s were fairly rudimentary by today’s standards, both in the British and US context above. In a similar manner the UCAV projects detailed earlier in this article are also quite new in terms of technology. These have achieved laudable milestones. Autonomous take off and landing is no mean achievement; autonomous take off and landing on an aircraft carrier is even more impressive. However, these are just the first steps in development of UCAVs that are able to actually take on combat tasks and carry these tasks out with high efficiency especially in view of the numerous grey areas in actual combat missions and the “fog of war”.

It is far too early to trumpet the end of the manned fighter as the primary combat platform of major air forces. As far as can be reasonably be forecast, the manned jet fighter in its “fifth generation” avatar is likely to form the mainstay of major air forces for the better part of the first half of the twenty first century. Aircraft development programs the world over also indicate this trend. Thus we have the US’ F-22 and F-35, India and Russia’s Sukhoi T-50 PAK FA /FGFA, Europe’s Rafale, and Eurofighter Typhoon, and China’s J-20 and J-31^{xi}.

All these manned fighters, except the F-22 which is in squadron service, are currently under development and are expected to be in front line service for the better part of the period going on to 2050-60. During this period the UCAVs under development could be expected to progressively enter service and operate in a complementary role to manned fighters. UCAVs could be expected to undertake roles in co-ordination with manned fighters. Such missions as deemed too dangerous militarily or politically for a manned craft to undertake could be entrusted to UCAVs at least initially. Once adequate experience has been gathered and refinements made to the UCAV hardware and software UCAVs may take on more roles possibly even replacing manned combat craft in a progressive and gradual manner in a time span extending into the next century.

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Conclusion

In almost all countries capable of undertaking design and development of advanced aircraft programs for development of fifth generation fighters as well as UCAVs are under progress. The successful flights of a few under development UCAVs have led a few analysts to postulate that the era of manned fighters is coming to an end. UCAVs, the numerous programs under way all over the world notwithstanding are not assessed to be anywhere close to totally replacing manned fighters in the next four to five decades. In this period they could be expected to be seen in operation alongside manned fighters. Towards the end of this century UCAVs may be able to take on more autonomous combat roles if their development progresses well. In sum, for the better part of this century at least UCAVs are likely to supplement and complement rather than replace manned aircraft.

(Disclaimer: The views and opinions expressed in this article are those of the author and do not necessarily reflect the position of the Centre for Air Power Studies CAPS)

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ⁱ See http://www.spacedaily.com/reports/UKs_most-advanced_aircraft_makes_successful_test_flights_999.html, accessed on 06 Feb 2014.

ⁱⁱ See http://www.spacedaily.com/reports/UKs_most-advanced_aircraft_makes_successful_test_flights_999.html, accessed on 06 Feb 2014.

ⁱⁱⁱ Brandon Vinson, "X-47B Makes First Arrested Landing at Sea", http://www.navy.mil/submit/display.asp?story_id=75298, accessed on 06 Feb 2014.

^{iv} "Dassault nEUROn Unmanned Combat Air Vehicle (UCAV) (2018)", http://www.militaryfactory.com/aircraft/detail.asp?aircraft_id=987, accessed on 06 Feb 2014.

^v James Hardy, "China's Sharp Sword UCAV makes maiden flight", <http://www.janes.com/article/30628/china-s-sharp-sword-ucav-makes-maiden-flight>, accessed on 06 Feb 2014.

^{vi} "DRDO AURA Unmanned Combat Air Vehicle (UCAV) (2020)", http://www.militaryfactory.com/aircraft/detail.asp?aircraft_id=989, accessed on 06 Feb 2014.

^{vii} Frank Sauer, "Banning Lethal Autonomous Robots", <http://icrac.net/2013/10/news-roundup-banning-lethal-autonomous-robots/>, accessed on 06 Feb 2014.

^{viii} "English Electric Lightning T.5 - XS420", <http://www.xs420.com/design--development.html>, accessed on 06 Feb 2014.

^{ix} David Noland, "Cancelled: Britain's High-Mach Heartbreak", <http://www.airspacemag.com/military-aviation/cancelled-britains-high-mach-heartbreak-4036788/>, accessed on 06 Feb 2014.

^x "F-4 Phantom II", <http://www.globalsecurity.org/military/systems/aircraft/f-4.htm>, accessed on 06 Feb 2014.

^{xi} Xu Lin, "Top 10 fifth generation jet fighters in the world", <http://english.people.com.cn/90786/8506131.html>, accessed on 06 Feb 2014.