Haze on the horizon: the challenges and uncertainties of Europe's future combat aircraft plans

In 2017 France and Germany announced their intention to develop a sixth-generation combat aircraft to replace the Typhoon, Tornado, and Rafale aircraft that are currently in service. BAE Systems, Leonardo, and Saab almost instantly expressed interest in participating in the multi-billion-Euro programme, which is expected to be led by Airbus and France's Dassault Aviation. *Mark Bobbi* reports

France and Germany hope to develop a roadmap for a sixth-generation combat aircraft programme this year, ideally with concept studies and a hardware demonstration going on until the mid-2020s. This would be followed by a definitive system development and demonstration (SDD) effort, resulting in initial operational capability (IOC) and an in-service date in about 2045, 10 years later than the comparable US Air Force (USAF) Next-Generation Air Dominance (NGAD) aircraft (also known as the Penetrating Counter Air platform).

The first Royal Air Force F-35Bs to arrive at their home base, RAF Marham, last month. Assumptions in recent years that the F-35 would be the last manned fighter to be developed have proved to be wide of the mark. (Crown Copyright)

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The United Kingdom's position in the programme is questionable because of the ongoing Brexit process. However, such a programme without the United Kingdom seems unlikely, given Rolls-Royce's propulsion experience together with BAE's research and development (R&D) prowess, production capabilities and F-35 learning. The challenge for the United Kingdom is whether to support the US-led NGAD effort, which will be based around a Joint Strike Fighter-type model, or a

Euro proposal that will be Franco-German led and based on an Organisation for Joint Armament Co-operation (OCCAR) Typhoon development and production model.

Why now?

Why is Europe considering spending many billions of Euros on a new manned combat aircraft? In the European tradition the most important reason is to retain industrial capability. In an era with industrial 'peers' in development or production of fifth-generation combat aircraft, industrial policy is paramount. Analysis by *Jane's* on Chinese, Indian, Japanese, Russian, South Korean, and Turkish advanced combat aircraft efforts suggests that, of these countries, China represents the biggest threat, with two aircraft to be concerned about right now. Furthermore, with the United States spending hundreds of billions of dollars on fifth-generation aircraft and beginning development of sixth-generation bombers and fighters (the B-21 Raider long-range strike bomber and NGAD), there is a danger that Europe will fall so far behind in advanced combat aircraft development capabilities that it would risk the complete collapse of its military aircraft industry and a strategic problem of biblical proportions. That simply will not happen – at least according to defence industry insiders and supporting politicians in France and Germany.

Secondly, Europe has realised that there is a major problem on its Eastern borders with Russia, which has already shown its preparedness to invade sovereign European territory with its annexation of Crimea in 2014. Further to that, Russian intrusion into European politics through internet hacking and subterfuge, along with the country's development of advanced weapon systems such as the Sukhoi Su-57 fighter, various new nuclear weapons, and highly advanced surface-to-air missiles, further heightens the threat for European states.

Third is the fact that, although unmanned systems have proved to be a vital asset, they are not the panacea many thought they would be. Indeed, it was not so long ago that European defence industry leadership had claimed there would be no future manned combat aircraft developed in Europe or the United States because unmanned technologies were obviating the need for manned systems. Just two years ago the *National Interest* ran an article entitled 'The F-35: The Last Manned Fighter Aircraft?'

Decades of US and international use of unmanned aerial vehicles (UAVs) have proven the concept for sure and further development of controls, software, and artificial intelligence will make future UAVs even more capable and effective – some even with no human in the loop. However, operational experience has also revealed significant limitations with unmanned systems, especially their vulnerability to cyber technologies and conventional electronic warfare attack. In short, it is understood that humans must be directly involved at the shooting end of the kill chain, even though the future will, perhaps, have that human in a large manned aircraft commanding dozens if not hundreds of offboard unmanned weapon systems.

Cost

Another big question is what will such a programme cost? Some are calling this programme a fifth-generation fighter and others say it will be a sixth-generation aircraft. Its IOC of 2040–45 suggests it will be a sixth-generation aircraft, although Europe has not developed a fifth-generation aircraft aside from BAE's participation in the F-35 and that of Rolls-Royce in the aircraft's short take-off/vertical landing (STOVL) propulsion system. So Europe has a lot of catching up to do, which will

be expensive. There have been estimates in the region of USD50 billion, which, based on precedent, are not out of the question.

To put some perspective on how much investment will be required to bring a fifth- or sixth-generation combat aircraft to market, one only has to look at US investment in 'stealth' technology since 1975, beginning with the launch of the Have Blue/Tacit Rainbow efforts of Lockheed and Northrop. Those two technology demonstrators led to the F-117 attack aircraft and Advanced Technology Bomber/B-2 respectively. *Jane's* has calculated that total US spending on the listed programmes to be more than USD270 billion in then-year dollars. The R&D cost for these efforts was USD144 billion, while the production cost was USD129 billion to fund and produce 773 aircraft up to fiscal year 2019 (FY 2019), the latest aircraft, of course, being the F-35.

Escalating all previous investments, spending totals USD270 billion in R&D and USD219 billion in production for a combined spend of USD489 billion.

That is a lot of history and learning that Europe will have a hard time catching up with, despite stealth technology information being publicly available for some time. That said, the historical investment and experience of the United States is one reason why the United Kingdom may choose it as a partner on a sixth-generation aircraft programme. The United Kingdom's involvement in the development and production of the F-35 is also a factor.

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