

“The Future European Air Combat System: Reality or Fiction? The need for cooperation. The challenge of a technology leap in the dark”

Executive Summary

Following Macron's speech at the Sorbonne in September 2017, announcing a strong push for the future of the Europe of Defence, a new Franco-German dynamic, which was later joined by Italy and Spain, has been pursuing, progressively and more rapidly, greater integration of European security and defence. The key to this initiative has been placed on the principle of cross-border defence cooperation in the development of priority military capabilities, which fulfill the main gaps in the defence sector, and in reducing the fragmentation of the current supply and demand dimensions, to ensure economies of scale, as well as to strengthening the competitiveness, innovation and efficiency of the European defence technological and industrial base.

Buoyed up by this new dynamic, on 24 April 2018, Airbus and the French group Dassault Aviation announced an agreement in principle for the construction of the new generation (6th generation) "**Future European Air Combat System**", whose main objective is to replace, by 2040-2045, the current European fleets of fighter jets. This is indeed a bold project, initially launched only bilaterally, with the intention that additional partners can join up later on.

As a matter of fact, the "Future European Air Combat System" is not only a mere new next-generation fighter jet (6th generation), but a system of multifunctional systems, sensors and platforms composed of a “swarm drones network enabled” or “Loyal Wingmen” of various types of piloted aircraft and remotely piloted vehicles (UAV/RPAS), as well as other flying objects (missiles, etc.). In this way, and with this flexible modular architecture, different components of the “Air Combat System” can be developed separately from a technological, industrial and geographical point of view, ranging from collaboration to sharing and not competition.

In June 2018, the MoD of France and Germany signed the "Operation Concept" of the Future Air Combat System. Meanwhile, Safran (FR) and MTU (GE) announced the establishment of a joint venture for the development and production of the aircraft's propulsion system.

On 17 June 2019, during the Paris Air-Show, Spain's Defence Minister signed a formal agreement to join the Franco-German project, which became from then on a trilateral project. In turn, Airbus Defence and Dassault Aviation announced their intention to develop a demonstrator and system propulsion by 2026 and the possibility of the new fighter jet entering operational service around 2040.

According to Augustine's Law (1984) doubts remain about the political and economic viability of this trilateral project, for three main reasons: (i) on the one hand, by 2040-2045, the vast majority of European and international countries will already be equipped and operating with F-35 fleets as well as the renewed F-16V, F-15Q, Saab Gripen E/F, Euro Tyfighter tranche 4 and Rafale F4; (ii) on the other hand, in view of the uncertainties surrounding the practical application of "Brexit", it all indicates that the "Franco-German-Spanish project" will compete with a conceptual similar British project "**Tempest Force 2030+**", leaving little room for the broad European and international cooperation necessary to achieve the so-called "*breakeven point*", which guarantees the economic viability of the project; (iii) last but not least, the lack of a sufficiently robust and consolidated demand to generate economies of scale, together with the ever rising costs of new technologies and sophisticated weapons systems, will require a high dependence on exports to third countries, which is difficult to guarantee because of the current related geopolitical uncertainties of the world's security environment landscape.

However, it should be underlined the importance and political significance of this announcement of Franco-German-Spanish intentions, as it constitutes a turning point and a milestone that marks the end of a long period of 33 years of "divorce" and direct technological-industrial competition between the Eurofighter consortium and Dassault Aviation construction company Rafale, hopefully making a healthy, necessary and urgent European defence cooperation from now on.

For the European Defence Technology and Industrial Base (EDTIB), most likely with the exception of the United Kingdom because of its fully participation from the outset in the F-35 american fighter (5th generation), the technological-industrial development of a 6th generation combat aircraft, without going through the indispensable technology research learning curve, experience and manufacturing competences required by the 5th generation, means a great "technological-industrial leap", very risky in terms of non-compliance with the established time schedules and, of course, the sliding of development and industrialisation costs, which could lead to the lack of the project's competitiveness.

In fact, the differentiating technologies of the 5th and 6th generations are quite different from the 4th generations of aircraft currently developed and produced by the EDTIB. The technological leap in the dark proposed for the project "Future European Air Combat System", if not properly taken care of nemely in the most critical and disruptive technologies (*i.e ultra low observable or stealth technologies*), may lead to its fall in the "Valley of Death" (Valley of Death), which consists of a sheer precipitous between the technology research phase and the technological-industrial development phase. The immediate consequences of such an occurrence could be consecutive delays in time schedules and much higher unit costs than previously estimated, which could only be mitigated through a large number of orders, which seems unreasonable to us in the foreseeable future.

Table 2: Comparison between the European aircraft projects and the US JSF

Aircraft	R&D costs (EUR billion)	Units envisaged/produced
Eurofighter	19.48	707
Gripen	1.48	204
Rafale	8.61	294
JSF	19.34	3003

Source: Briani, 2013, p.16.

A PricewaterhouseCoopers (PwC) report of 25 May 2021 "*Tempest: Innovation for UK Security and Prosperity Report*" concluded that the Tempest project will cost €31620M in the period 2021-2050 and that it will generate more than 21000 highly qualified jobs in that period. Recent studies by the European Commission, together with the European Aerospace and Defence Industry Association (ASD), lead to the conclusion that, in the face of the imponderable technological and highly skilled labour challenges, mostly lacking in Europe, and taking into account the high development costs as compared to the acquisition costs, no European country alone and without the participation of the United Kingdom, will be able to develop and produce a next-generation fighter jet.

Therefore, there is, however, the possibility of a third way, which would consist of the countries participating in both European Air Combat projects being able to join forces in the development of certain more sophisticated and expensive technological areas, which can meet the requirements of both projects.

European institutional instruments facilitating this cooperation of efforts already exist, as the defence ecosystem now includes more imaginative, creative, flexible and practical forms of the diversity and effectiveness of financial supports and incentives truly fostering new European approaches to cross-border defence cooperation, based on the 4th industrial revolution (Industry 4.0).

In fact, the 2018 Capability Development Plan (CDP), the Annual Defence Coordination Plan (CARD), the European Defence Fund (EDF) and the Permanent Structured Cooperation (PESCO) provide a new window of opportunity to foster defence cooperation and develop a shared, innovative and competitive European technological and industrial base. It is already a reality that the EDF Annual Implementation Work Plan for 2021/2022, with a Community

budget of €1.200M, includes a high amount of €150M for direct award to the technological-industrial development of the European Air Combat System and is open to the participation of third countries, under pre-established conditions, to be assessed on a case-by-case basis , in accordance with the EDF Regulation.

Thus, the primacy will have to be based on the paradigm of the broadest and most efficient defence cooperation possible, including not only industrial partners, but also and especially government partners buyers ("end-users"), in order to gain technological-industrial synergies and critical mass that ensure the indispensable economies of scale to reach the "*breakeven-point*", which economically enables the project.

In my view such a desideratum will only be possible if at least the participation of the 6 European countries with the most developed aerospace industrial base is guaranteed, and provided that a huge sales forecast is ensured. This seems to us difficult to achieve, bearing in mind that most European and international countries have already decided to acquire the F-35, whose useful life will last well beyond the years 2055. It seems that, once again, Europe reacts slowly and belatedly in such a strategic and technological important area like aerospace, to the strengthening of the EDTIB's competitiveness and innovation.

Ensuring the new level of ambition of "strategic autonomy" set down in the European Union Global Strategy, in complementarity with NATO, asks for the need to reduce external dependence on technological-industrial value chains of large and complex weapons systems such as the "**Future European Air Combat System**". On the other hand it will also foster the EDTIB's competitiveness and innovation, to ensure the highly skilled workforce that Europe lacks and significantly reduce the strategic dependence, as well as the systematic loss of technological-industrial skills, which has occurred for a few decades in relation to tactical-strategic military air transport (C-130 vs Transall and finally the A-400M).

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