

European Future Air Power Systems (EFAPS)

in the 2035 perspective

‘A Food for Thought Paper’

June 2009

Aircraft Sectoral Group:

**Alenia Aeronautica
BAE Systems
Dassault-Aviation**

**EADS-CASA
EADS Military Air Systems
Saab AB**

ASG Vision¹

The European ambition to independently contribute to global security, and to face new defence and security challenges, is supported by a strong European Military Aircraft Industrial base, which is part of an enterprising culture providing world class competitive Air Power Systems.

¹ Aircraft Sectoral Group Vision for the European Defence and Security Aircraft Industry, Feb 2006

Executive Summary

In May 2007 the Defence Ministers of the European Defence Agency (EDA) announced their strategy for the European Defence Technological and Industrial Base (EDTIB). They noted that “...*Europe possesses a widely-capable, and in many sectors world-leading, DTIB...this is largely the result of past investments*”. They advocated “...*less European dependence on non-European sources for key defence technologies*” and to “...*make it natural and necessary for Europeans to cooperate more closely*”. In May 2008 the EDA Steering Board identified Future Air Systems (FAS) as a key priority for implementing the EDTIB strategy.

The Aircraft Sectoral Group (ASG) within ASD, representing Alenia Aeronautica, BAE Systems, Dassault-Aviation, EADS Military Air Systems, EADS-CASA and Saab AB, has issued this ‘Food for Thought Paper’ to present the collective view on European Future Air Power Systems (EFAPS). ASG perceives that key challenges to achieving the Defence Ministers’ aspirations for EDTIB will be:

- Security of supply of key capabilities for the customers.
- Access to state of the art industrial capabilities (e.g. technologies).
- Long term investment in FAS and its underpinning intellectual / people base.
- Coordination of efforts to maximise benefit to nations compared to their investment.

The consequence of these challenges not being met will be:

- Failure to affordably meet customer capability aspirations when required, and/or greater dependence on non-European solutions.
- Failure to build and capitalise on the existing strengths and benefits already achieved.
- Little or no gearing from joint development of technologies and systems with a tendency for each nation to revert back to national strategic imperatives.
- Future EDTIB capability is placed at risk.

The ASG has conducted a study on EFAPS that explored four widely different projections of the future and extracted the Defence and Security capability needs for these scenarios. A conclusion is that Air Power Systems will be required in all of the scenarios. This study also considers an EFAPS portfolio of systems in the 2035+ timeframe in the context of the future scenarios. It captures the capability drivers and identifies possible solutions. Key to achieving affordable EFAPS will be the development of versatile, adaptable, multi-role systems with low through-life support needs that are ready to integrate seamlessly with legacy systems.

Today investment across Europe is fragmented for FAS. It is clear from historical trends that a large proportion of FAS Government investment is centred on a small number of nations. It is therefore incumbent on these Governments to provide a coordinated approach to FAS which ASG also recommends. This will give the nations sovereign FAS solutions with freedom of choice to meet their individual needs on requirements, affordability, security of supply, sustainment of national key capabilities, and leverage with non-EU nations.

ASG believes that it is time to act in this matter and recommends the immediate launch of:

- An EFAPS Task Force to prepare a vision and define strategies and a roadmap to achieve the vision.
- Small pilot programmes in critical areas such as mapping out the ‘national coordinated approach’, new business models and effective collaboration, innovative demonstrators, technology identification and development.

ASG requests that Governments give urgent consideration to our recommendations, and that a start on implementing them be made as soon as possible.

1. Introduction

During past decades, the European Military Aerospace Sector has contributed to the excellence in European defence capability and wealth creation. The engineering skills and technologies developed in this sector have, for example, been a prerequisite for the build up of the European Civil Aerospace industrial base.

The Aircraft Sectoral Group (ASG), within the ASD framework, includes the European Aircraft Industries engaged in the development, production, support and service provision of European Air Power System solutions as prime contractors (Alenia Aeronautica, BAE Systems, Dassault-Aviation, EADS Military Air Systems, EADS-CASA and Saab AB).

ASG very much welcomed the initiative made by EDA and its steering board in presenting the Long Term Vision² (LTV), the European Defence Technology and Industrial Base (EDTIB) strategy³ and the decision taken by the EDA steering board in May 2008 to have Future Air Systems (FAS) as the first area to develop and implement the EDTIB strategy.

ASG perceives that key challenges to achieving these aspirations will be:

- Security of supply of key capabilities for the customers.
- Access to state-of-the-art industrial capabilities (e.g. technologies).
- Long term investment in FAS and its underpinning intellectual / people base.
- Coordination of efforts to maximise benefit to nations compared to their investment.

The consequence of these challenges not being met will be:

- Failure to affordably meet the capability aspirations of the LTV when required.
- Increased dependence on non-European solutions and consequent erosion of political independence.
- Failure to build and capitalise on the existing strengths and benefits already achieved, resulting in a serious decline in the EDTIB capability within the Air Power domain, e.g. integration skills, facilities, research, etc.
- Other impacts to EU society, e.g. less employment, decrease in spillover of technology and know how.
- Little or no gearing from joint development of technologies and systems with a tendency for each nation to revert back to national strategic imperatives.

ASG is concerned about the apparent position taken by EU governments and has undertaken the study described in this 'Food for Thought Paper' to stimulate debate regarding the future of European Air Power. ASG has identified actions that should be urgently implemented to start the process for Europe.

This ASG study involved operational, technical and business specialists, and provides an industrial perspective on the following three questions:

- In an unpredictable future what are the typical or common European Defence and Security needs which would be effectively addressed by Air Power?
- What would an efficient and flexible European System of Systems solution look like which robustly meets most future Air Power needs?
- How should a path for Europe be defined to obtain world class, cost-effective, and always relevant indigenous capability?

² An initial Long-Term Vision for European Defence Capability and Capacity Needs, 3 October 2006

³ A strategy for the European Defence Technological and Industrial Base, Brussels, May 14 2007

2. Air Power needs in an unpredictable future

"Prediction is difficult, especially about the future" (Attributed to Mark Twain)

The EU is increasingly taking responsibilities in security matters with an expansion envisioned in the constitutional treaty. The EU will continue to be a global security actor and will need to adapt to the increasing complexity and variety of future defence and security operations. A manifold of potential risks to peace and security will be encountered and has to be managed in the context of the European Security and Defence Policy.

The question is how to capture the broad spectrum of possible evolutions? A common way is to do this via scenarios, spanning a reasonably broad space of potential futures. A variety of such scenarios has been elaborated by various institutions and groupings. In particular the European Commission has initiated ESRIF⁴ who have constructed four widely differing scenarios which have been adopted for this study.

These scenarios are:

- **Global governance:** Global problems, in particular climate change, induce the leading world powers to embark on a path of unprecedented far-reaching cooperation.
- **Multi-polar realism:** Competition and lack of trust between the leading world powers: China, India, EU and the US.
- **New welfare for all:** The US and its close ally EU regain the commitment of the 1990s to furthering liberal democracy and human rights worldwide with a combination of soft and hard power.
- **The West between threat and attraction:** The US and its somewhat unwilling junior partner EU find themselves submerged in an ever-ongoing global struggle against violent extremism.

These scenarios (encompassing political, social, economic, defence, security and other aspects) have been further developed to define the security situations, threats and the conflicts between actors. The needs for each scenario were then analysed and extracted and those needs which could and should be most appropriately satisfied by Air Power Systems of the future were identified.

A key finding from this work is that most of the major functionality currently associated with 'Air Power Systems' is required in all of the scenarios. It was also found that most of the areas across the spectrum of conflict from Emergency Relief, through Peacekeeping, all the way to Global War required Air Power.

Furthermore it was determined that roles which would be effectively addressed by Air Power were:

- **Homeland Protection.** Military aspects are embedded in the wider security context with civil-military co-operation or even integration. Examples are:
 - Protection of population, infrastructure and territory against all sorts of air threats from outside or from within the territory, land or sea.
 - Protection of borders -blue and green- against intrusion.
 - Need to control or prevent migration, with military support in areas where the civil authorities lack sufficient means.
- **Peace Support Operations.** The goal is the restoration of a stable and peaceful status between conflicting parties. Examples are:

⁴ European Security Research and Innovation Forum

- Pacification in a conflict between states.
- Establishing law and order within a (failing) state.
- **Limited Scale Military Conflicts.** The conflict takes place at a distance from Europe with the need "to win the war" whilst providing Homeland Protection. Examples are:
 - Power projection with a large EU force.
 - Joint offensive and defensive operations with full spectrum dominance.
 - Sustained operations over an extended period.
 - Defence of National Sovereign Dependent territories by national or coalition forces.
- **Support of External Politics.** Exclusively political instruments with their value not determined by military effectiveness Examples are:
 - Coercion capability arises where a state or organisation is to be dissuaded into an acceptable stance.
 - Credible deterrence capability either to strike pre-emptively or to retaliate in scale following an attack.
 - Support of politics with a broad array of military means creating political options to act or to escalate / de-escalate in case of conflict.
- **Interventions Required in Support of Supranational Requests.** These are not of a genuinely military nature and arise abroad and worldwide. Examples are:
 - Humanitarian crisis relief.
 - Human rights enforcement.
 - Containment in the case of a pandemic.
 - Participation in smaller scale interventions within a coalition.
 - Participation in the enforcement of sanctions.
 - Support of international law enforcement actions.
 - Support of EU migration policy.
 - Evacuation operations.

These needs include the employment of traditional military force and increasingly embrace security related operations with civil/military interaction and cooperation. These arise within EU territory and along its borders and support of operations at significant distances from the EU mainland.

Air Power Systems have historically proved to be an efficient and cost-effective means of providing, with relatively few assets, a wide spectrum of defence and security functionality. Our analysis shows that Air Power Systems will continue to be one of the most important elements enabling Europe to play a major role in the global political arena. Therefore the ASG view is that a robust plan for the future needs to include significant Air Power capability.

3. EFAPS: A robust solution to most Air Power needs

Building on the analysis described in Section 2, outline Air Power needs have been identified. These will be characterised as multinational, both symmetric and asymmetric, leading to the need for a broad array of capabilities that has to be provided by air systems, e.g.:

- Quick reaction and flexible response.
- Surveillance and protection for all operations, air, land and sea.
- Delivery of a wide range of effects.
- Projection over strategic distances and within all domains.
- Conducting operational command and control.

The development of the European Future Air Power Systems (EFAPS) is perceived to be evolutionary. This will be comprised of upgrades and spiral improvement of legacy air power components complemented by new systems where increased performance or affordability is required. It will be done through an exploration of both new and innovative systems as well as systems similar to those of today.



The appropriate integration of such classes of systems illustrated in the figure above, each of them with their own prevailing capability niche, will support the implementation of the EFAPS System of Systems providing:

- Effective capability coverage for future National and European needs.
- A naturally cost-effective solution tailored to National and Europeans needs, due to the complementary nature of its components.
- A naturally flexible and robust solution due to both the ability to select relevant assets and ease the overall integration of the systems.

A trade-off will have to be made between the conflicting requirements of cost-effectiveness and flexibility (both of which are driven by the degree of overlap of component functionalities) and many other factors, in order to optimise the overall benefits to the users.

Important features of EFAPS will be in the areas of Versatility, Affordability and Legacy System performance versus Development.

Versatility: EFAPS must have versatility for the unforeseen. The achievement of such a goal will be realised through the exploration of the relevant trends in the operational needs and the

implementation of a robust and flexible architecture for the systems and components. This will allow the solutions to be continuously adapted to the evolved operational environment.

Affordability: EFAPS must be designed to meet the requirements in an affordable manner through life. The achievement of this goal will be realised through a flexible system architecture to support the evolution of customer Defence and Security needs. This will be underpinned by trade-offs between specialised and multirole systems. This will also be supported by the implementation of innovative business models and the development of innovative support concepts.

Legacy System performance versus Development: In order to meet new operational requirements a trade-off will be made between the enhancement of legacy systems and the development of novel ones. This will ensure that the most cost-effective solutions will be proposed. Note that more cost-effective collaborative models for the on going support and sustainment of the existing fleets of aircraft may provide a means of creating significant savings, thus providing additional 'head-room' for funding of development.

In considering the major future trends in Air Power, it may be expedient to classify EFAPS into three major groups:

- **Contemporary systems** with significantly more capability.
- **New systems** such as unmanned autonomous systems and novel weapons with key capabilities to cope with larger operational context.
- **Innovative systems** developed to address future requirements like:
 - New types of operational capabilities needed, like space or hypersonics.
 - Providing current operational capabilities, but in a more cost-efficient and ecological way.

Then it may be noted that for all the systems above, trends in certain key characteristics are also apparent:

- Network Enabled Capability (NEC), which will be essential to ensure information exploitation and situational awareness.
- Extensive use of multirole capabilities and commonality of subsystems.
- Longer reach and endurance to cope with broader operational scenarios.
- Increased Interoperability within national air systems, between national forces and with civilian actors.
- Increased Survivability where appropriate.
- Increased Reliability, Maintainability, Sustainability to support the Customer along the extended life cycle.

4. Partnership Roadmap for Europe to obtain world class capability

In May 2007 the Defence Ministers of the European Defence Agency (EDA) announced their strategy for the European Defence Technological and Industrial Base (EDTIB). They noted that “...*Europe possesses a widely-capable, and in many sectors world-leading, DTIB...this is largely the result of past investments*” and that in comparison to the US “...*the imbalance is especially acute in spending on research, technology and development – the ratio is currently some 6 to 1*”. They advocated “...*less European dependence on non-European sources for key defence technologies*” and that “...*the problem of accessing the US Defence market, and of establishing balanced technology exchange across the Atlantic, make it natural and necessary for Europeans to cooperate more closely to ensure the future of their own DTIB.*”

In May 2008 the EDA Steering Board identified Future Air Systems (FAS) as a key priority for implementing the EDTIB strategy. Actions taken in this direction are welcomed by Industry.

Investment across Europe has lacked coordination for FAS resulting in lost opportunities for benefits of economies of scale on lower unit cost and health of the supply chain. It is clear from historical trends that a large proportion of FAS Government investment is centred on a small number of nations. It is therefore incumbent on these Governments to provide a coordinated approach to FAS. This will still leave nations freedom of choice to meet their individual needs on requirements, affordability, security of supply, sustainment of national key capabilities, and leverage with non-EU nations. A national coordinated approach by a small number of EU nations which are strongly committed to developing FAS, would:

- Give the participating nations a sovereign FAS solution, starting with studies, evolving to demonstrators on high risk areas, culminating in programmes providing deployable capabilities.
- Give European alternatives to potential customers

ASG proposes a strategy that:

- Builds and capitalises on the existing strengths and benefits already achieved.
- Recognises key national priorities.
- Recognises that Governments will collaborate in Europe if they will gain benefits.
- Encourages other EU nations and institutions to contribute where they have specific discriminating capabilities.

European military aerospace suppliers today provide significant capabilities and benefits to nations. They have had to be highly innovative in meeting their customer’s requirements. As a result, every single major European supplier has created its own unique discriminating world class capabilities to meet the specific national needs of its customer (e.g., niche technologies, systems integration skills, through life support etc). The collective power of these world class capabilities, a Best Athlete based supply chain, new methods of collaboration and binding political agreements between nations, will enable Europe to:

- Develop and produce world class, efficient, through-life affordable European Air Power Systems, with high gearing of benefit to nations compared to their investment.
- Have freedom to act autonomously without reliance on other countries.
- Have security of supply.
- Tailor affordable solutions to the specific needs of EU users.
- Provide timely upgrades and through life support.
- Have a strong position to strategically exchange technologies with non-European actors.

- Have a healthy, vibrant and highly skilled Industrial Base (primes, supply chain, SMEs).

Innovative methods and processes for European collaboration will have to be developed. These methods must focus on the cost-effectiveness of the programmes and the lead time from requirements identification to capability delivery. This will have to be done whilst considering the foreseen rapid change of operational capability needs, to be able to reach the dynamics the future Defence and Security operational imperatives.

ASG has identified some of the necessary actions that need to be taken by Governments and Industry to ensure the required capabilities (both customers and industrial) within Europe:

- Obtain the political support expressed in the EDTIB strategy and define near term actions. The potential for Civil and Security exploitation of the capabilities developed and sustained by this strategy should also be taken into account.
- Agree the mechanisms for funding the actions identified within an EFAPS roadmap to enable the start of required initiatives.
- Mature the requirements for the systems and to reach commonality between the different nations.
- Provide necessary detail on the appropriate ‘national coordinated approach’ for EFAPS, e.g., alignment of future investments, identification of common and unique national requirements, shareable/non-shareable capabilities, national sustainment and security of supply priorities.
- Define the system design process that considers both the maturation of the solution as well as the flexibility towards late changes in the requirements. The aspect of Support and low Life Cycle Cost solutions has to be considered as a vital part of the process and involve the industrial base.
- Establish the required industrial capabilities, for the Military Aerospace Primes as well as for the Supply Chain, to meet future needs. Special attention should be given to enabling technologies where Europe is currently dependent upon external sources, and to keep the ‘cutting edge’ in capabilities where we have primacy.
- Define and develop a future joint management of the EFAPS implementation.
- Create new business models as well as harmonised commercial processes will be necessary from customers, through prime contractors, and into the supply chain.

The above items are not in any priority order. Furthermore all of the actions should be addressed in as parallel a fashion as possible without allowing some threads to block progress in others.

Past experience has proven that planning, funding, developing, deploying and supporting complex, multi-partner system takes a considerable amount of time. A harmonized approach between Governments, their agencies, the industry and research institutions is essential. Therefore Governments should initiate collaboration activities that keep European options open, alongside discrete national programmes.

5. Recommendations

Critical for the success of the EFAPS initiative will be cooperation between key stakeholders. Governments and Industry should engage and make a start on an EFAPS process now. ASG is certain that investment now will embark Europe on a process that will yield credible European solutions. This will keep the European alternative possible for procurement in the medium term. In the long term EFAPS should become the natural compelling choice for Europe.

ASG welcomes dialogue and engagement and is committed to the development of the EFAPS vision and EDTIB strategy for Europe. The Air Power Systems primes of Europe offer close collaboration to develop cost effective European solutions for the medium-long term future. ASG has proposed a start via the ASG Vision and the EFAPS study, considering solutions for the future and means of collaboration, but needs Nations and European Institutions engagement. Are Governments prepared to initiate this dialogue?

The ASG view is that action is needed now in the Air Systems domain to:

- Ensure current and future EDTIB capability.
- Enable future European Air Power Systems to be operationally ready in the medium-long term.

ASG recommends a **national coordinated approach** by a small number of EU nations which are strongly committed to developing FAS. This will give the nations a sovereign FAS solution (studies, demonstrators, programmes) with freedom of choice to meet their individual needs on requirements, affordability, security of supply, sustainment of national key capabilities and leverage with non-EU nations.

ASG recommends **launching an EFAPS Task Force** including relevant stakeholders, but limited in number of participants. Their tasks should be to:

- Prepare a vision for EFAPS in the 2035+ timeframe considering both Defence and Security domains.
- Define strategies to achieve this vision.
- Define an EFAPS roadmap and required actions.

ASG also proposes the **launch of small pilot programmes** in the following areas:

- Map out the ‘national coordinated approach’ for EFAPS, e.g., alignment of future investments, identification of national requirements, shareable/non-shareable capabilities, national sustainment and security of supply priorities.
- Effective collaboration and new business models across all stakeholders, e.g. implications of ‘Juste retour’ on competitiveness needs to be addressed.
- Identification of and demonstration of new innovative systems.
- Identification and development of key technologies.

ASG recommends the **urgent start of such pilot programmes** to ensure that Europe maintains and builds on the technical capabilities from the investments made within the ongoing programmes.

ASG requests that Governments give urgent consideration to our recommendations and that a start on implementing them be made as soon as possible.