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STAR21
Strategic Aerospace Review for **the 21st century**
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Creating a coherent market and policy framework
for a vital European industry

European Commission



Enterprise publications

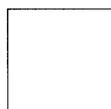
STAR

Strategic Aerospace Review for

**Creating a coherent market and policy framework
for a vital European industry**

July 2002





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Members

The European Advisory Group on Aerospace was set up in 2001 to analyse the adequacy of the existing political and regulatory framework for aerospace in Europe, to highlight deficiencies and to make proposals for further improvement. Chaired by Erkki Liikanen, Member of the European Commission responsible for Enterprise Policy, it comprises seven aerospace industry chairmen, five European Commissioners, the EU High Representative for the Common Foreign and Security Policy and two Members of the European Parliament.

Over the last 12 months the members of the Advisory Group have analysed this question, identifying the key areas which will determine the future competitiveness of the industry and its ability to contribute effectively to Europe's main policy goals. Their findings are presented in the attached report entitled Strategic Aerospace Review for the 21st Century (STAR 21), which the Group presented to the President of the European Commission, Romano Prodi on 16 July 2002.



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Executive Summary

Europe's needs

In recent years Europe's leaders have defined far-reaching goals for the European Union which have major implications for the aerospace industry, setting, on the one hand, ambitious targets for Europe's competitiveness and, on the other hand, key objectives for the EU's foreign and security policy.

In its *Strategic Aerospace Review for the 21st Century (STAR 21)* the European Advisory Group on Aerospace argues that these goals can only be met if the economic and industrial structures in Europe are capable of responding to the new requirements. A flourishing and competitive aerospace industry is essential to ensuring a secure and prosperous Europe. Apart from its contribution to sustainable growth, the aerospace industry is a home to key skills and technologies and an important driver of innovation; it guarantees the means for delivering services from space, and makes an essential contribution to security and defence, thereby helping to safeguard Europe's freedom of action in its external policies.

Industry characteristics

The European aerospace industry is a world leader in several key market sectors, accounting for one third of the world's aerospace business in terms of turnover, compared with almost one half for its US counterpart.

The wellbeing of the industry depends on twin pillars, namely, civil and defence. They are both complementary and mutually dependent. Operating in civil and defence markets means sharing skills and technologies, and enjoying economies of scale and the benefits from a broad

product range. Civil and defence requirements both rely on the application of advanced technologies, while serving private and public customers with different needs.

Entry for newcomers to the aerospace industry is very difficult, especially at prime level. This stems from the interdependence of the civil and defence sectors as well as the highly cyclical and capital-intensive nature of the industry. This means also that once the technology, skills and infrastructure are eroded or disappear, they are extremely difficult to re-create.

As regards international competition, US companies operate in the world's single largest home market and benefit from a highly supportive operating framework which is designed to underpin a declared policy aim to maintain US supremacy in aerospace. The direct linkages between defence and civil uses, and the heavy investments in defence to fund research and innovation bring clear advantages to the US industry in terms of beneficial spin-off effects in non-defence aerospace applications. This situation poses a constant challenge to European industry and cannot but affect its competitive position.

Since for most markets, US and European companies will continue to supply the needs of customers worldwide, strong European aerospace capabilities are indispensable to maintaining competition for a wide range of civil and defence products.

Within Europe major restructuring has taken place in recent years, leading to an industry organised on a European scale, as a competitor and partner of its powerful US counterpart. Yet, the policy framework which governs its activities is too fragmented. It is appropriate that, as the aerospace industry itself has

restructured on a European level, the issues that will determine its future competitiveness and contribution should be addressed from a European perspective.

Key findings

In considering the issues from a European perspective, STAR 21 has identified four key findings:

- I. Aerospace is vital to meeting Europe's objectives for economic growth, security and quality of life. It is directly associated with, and influenced by a broad range of European policies such as trade, transport, environment and security and defence.
- II. A strong, globally competitive industrial base is essential to provide the necessary choices and options for Europe in its decisions as regards its presence and influence on the world stage.
- III. European aerospace must maintain a strong competitive position if it is to play a full role as an industrial partner in the global aerospace marketplace.
- IV. Europe must remain at the forefront of key technologies if it is to have an innovative and competitive aerospace industry.

STAR 21 notes that while some progress has already been made in a number of areas, the current political and regulatory framework is insufficient to bridge the gap between Europe's ambitions and the capacity to deliver the required results.

Policy recommendations

A coherent, long-term perspective is essential for planning and investment by the aerospace industry. STAR 21 identifies a number of areas in which the European Institutions, the EU Member States and

the industry itself must act to maintain Europe's position as a world-class aerospace producer and to provide the capabilities in defence, security and space which will allow Europe to make essential political choices and to be an effective partner for friends and allies.

The main recommendations of STAR 21 cover world markets, the operating environment, governance of civil aviation, European security and defence, and space capabilities. In many of these areas, for example the coordination of civil aeronautics research and the regulation of civil aviation, solid progress has already been made or will be achieved through the implementation of measures already proposed. In other areas, for example defence, space and the level and structure of research and technology in all market segments, which are vital for the development of industry, early decisions are required to avert a closing off of policy options for the future.

As far as access to world markets is concerned, Europe's goal should be to secure a level playing field which will favour competitive enterprises. This will require pushing for further market opening, especially by seeking changes to 'Buy America' practices and convergence in export control policies. At the same time Europe should build and develop its relations with third countries, including through international cooperation programmes.

With respect to the operating environment, STAR 21 highlights the key role of research for industry's competitiveness. While welcoming the creation of the Advisory Council for Aeronautics Research in Europe (ACARE), STAR 21 draws attention to the huge challenge involved in mobilising the estimated €100 billion from private and public sources needed to fund a coordinated civil research strategy over

the next 20 years. In a related area, the importance of the impact of tax incentives as a driver for research is acknowledged and more detailed analysis of this aspect is called for. As regards human resources, STAR 21 stresses the need for appropriate actions, especially at the level of Member States, to ensure the availability of a highly skilled and mobile workforce.

As regards areas in which good progress is being made the report cites in particular the issue of governance of civil aviation, adding, however that the full benefits from relevant developments will only be obtained by allowing the EU to become the policy-maker and regulator. This requires a wider role for Community bodies including the European Aviation Safety Agency (*EASA*), as well as the development and implementation of a master plan for air traffic management in Europe. It also leads to the Community becoming a member of the International Civil Aviation Organisation (*ICAO*) alongside the Member States.

It is in the areas of security and defence and related research that the most pressing need for added efforts to secure the future of the European industry is identified.

- Such efforts are needed to ensure a highly capable European industrial and technological base which is an essential prerequisite to guaranteeing the industry's overall future competitiveness. Yet the mismatch between, on the one hand Europe's goals and requirements and, on the other hand, the policy framework within which the aerospace industry is called upon to contribute to the delivery of the necessary capabilities, needs to be addressed urgently.

- Putting in place the arrangements for delivering the agreed capabilities requires commitment, resources and coherent organisation. There has recently been encouraging progress in defining and agreeing capability requirements as part of the European Security and Defence Policy. Bearing in mind that this is only a first step towards meeting the future requirements of the new European security policies, it is essential that adequate financial resources be committed to enable plans to be realised, and that necessary rules and procedures be put in place to ensure that such resources are spent efficiently. This will also require a more coordinated approach to armament at European level, leading eventually to a European armament policy.
- But while there is still some reticence about agreeing that key questions such as defence procurement and associated research - traditionally matters for national decision - should also be addressed at a European level, there is growing recognition that decisions on the level of spending on defence equipment, re-setting priorities within existing defence budgets and the appropriate response to new threats need to be approached in a European context. Thus, welcome efforts to improve the coordination of research programmes and towards more cost efficient procurement arrangements, mainly through more intensified cooperation among certain Member States, are now being formalised through a number of different agreements.

Independently of the overall level of ambition which must necessarily be determined at the highest political level, failure to optimise expenditure on aerospace including its key components, research

and defence, will limit future political options for Europe. Apart from the overall level of resources, fully coordinated investments in research and development and efficient procurement are key to delivering the necessary European capabilities, and to ensuring the contribution of a competitive aerospace industry.

Despite recent advances, progress is insufficient. To help overcome this problem, all available means have to be explored, including action, where appropriate at Community level, in order to remove the impediments to the competitiveness of European industry. Taking due account of the special characteristics of the defence and security sector, Community experience should be utilised in the situation in which the products and processes derived from technological development and innovation in practice do not distinguish between civil and security and defence applications.

On space capabilities, STAR 21 welcomes moves to develop a consolidated European space policy and a

European space plan with adequate resources, in line with the joint strategy between the European Space Agency (*ESA*) and the European Commission (*EC*). The Galileo satellite positioning system must, however, be deployed on schedule with development of downstream activities, providing opportunities for early involvement of the private sector. Development of Global Monitoring for Environment and Security (*GMES*) must be continued with support from *ESA* and *EC* programmes. Equally important is the need for early action to sustain European launch capabilities and to explore applications of space technologies especially for communication and monitoring, including those required for security and defence.

Europe's political leaders are invited to seriously consider how to bring about the needed commitment to the increased resources and more coherent European framework required to meet Europe's existing and future political goals.

The European Advisory Group on Aerospace invites the widest possible response to its analysis and recommendations. It looks forward in particular to the reaction of those parties which are best placed to give effect to its recommendations, namely, the Member States and the Community Institutions. In the light of these reactions and other relevant developments, the Group stands ready to further contribute to the discussion.

1.

Achieving Europe's long-term goals

Europe faces the 21st century with high ambitions. It aims for a better quality of life and higher living standards, which in turn depend on its competitive strength. Its citizens are aware that events far from their own borders can have a profound effect on their lives, and they wish to exert greater influence for good in world affairs, as valued partners to friends and allies.

A flourishing aerospace industry is a key component in enabling Europe to realise its political and economic ambitions. Strong European aerospace capabilities have become indispensable to maintaining competition in world markets for a wide range of civil and defence products and safeguarding Europe's freedom of action in its external policies. The aerospace industry itself has restructured on a European level, so the issues which affect it should also be addressed from a European perspective.

Over the last few years European leaders have defined far-reaching goals which have major implications for the aerospace industry, setting targets for Europe's economic competitiveness and for the EU's foreign and security policy.

Competitiveness

The Lisbon Summit in 2000 set the ambition for Europe to become the most competitive knowledge-based economy in the world, achieving new levels of competitiveness by 2010. The 2002 Barcelona Summit took stock of progress in implementing the Lisbon Strategy and gave it new impetus. The development of the European Research Area following the Lisbon Council testified to Europe's continuing commitment to strengthening its technological capabilities by undertaking more effective research in common. This was also reaffirmed in Barcelona.

"The Union has set itself a new strategic goal for the next decade: to become the most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion"

Lisbon European Council conclusion, 2000

"In order to close the gap between the EU and its major competitors, there must be a significant boost of the overall R&D and innovation effort in the Union, with a particular emphasis on frontier technologies"

Barcelona European Council conclusion, 2002

Security and defence

Since the end of the 1980s the geopolitical situation has changed dramatically. The end of the Cold War, the impact of regional conflicts such as that in ex-Yugoslavia and the emergence of the global terrorist threat leading to the war in Afghanistan illustrate the new challenges confronting Europe.

The aim of strengthening Europe's role on a changing world scene was expressed in the Maastricht Treaty of 1994, which established the European Union's Common Foreign and Security Policy (CFSP). The structure was further refined in the 1997 Amsterdam Treaty.

A European Security and Defence Policy was launched at the Cologne European Council in 1999, with plans elaborated in subsequent Councils at Helsinki, Feira, Nice and Laeken. Today's agreed goal of the European Union is to build up capabilities for humanitarian assistance, rescue, civil protection, policing, peacekeeping and combat-force tasks related to peace-making. The immediate aim is the creation of sustainable forces capable of the full

range of Petersberg tasks (up to 60 000-strong), deployable world-wide within sixty days by 2003.

The implementation of such ambitious goals will depend on the availability of adequate structures and access to the equipment required. To safeguard its political independence Europe's industrial and technological capabilities – specifically in aerospace - must be strengthened.

"The Union must have the capacity for autonomous action, backed up by credible military forces, the means to decide to use them, and a readiness to do so, in order to respond to international crises..."

"We recognise the need to undertake sustained efforts to strengthen the industrial and technological defence base, which we want to be competitive and dynamic."

Cologne European Council conclusion, 1999

Matching ambitions and capabilities

These ambitions can only be met if the European economic and industrial structure is capable of responding to the challenges that lie ahead. Fulfilling these ambitions means looking into the future, anticipating developments and taking the appropriate policy decisions in the near term that will enable Europe to meet medium and long-term needs. Much remains to be done if Europe's capabilities are to match its political goals.

Aerospace is an industry accustomed to looking far into the future: a new generation of aircraft can take a decade or more from conception to realisation; a space project may take even longer; research into a new composite may mean a generation of work before it is ready for practical application. By the same token a long-term policy framework is essential if the aerospace industry is to provide the capabilities which are required to match Europe's goals. This is especially true of the defence side of the business, where governments are the sole customers.

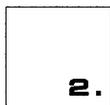
The wellbeing of the industry depends on the twin pillars, civil and defence. They are complementary to each other but mutually dependent. Operating in civil and defence markets means sharing know-how, skills and products, enjoying economies of scale and the benefits of a broad product range. Both rely on the application of advanced technologies while serving private and public customers with different needs.

The STAR 21 analysis

Over the last 12 months the European Advisory Group on Aerospace has analysed these questions in depth, identifying the key areas which will determine the future of the industry. The Group welcomes progress which has already been made, but the political and regulatory framework which currently exists cannot effectively resolve the wide disparities between Europe's aspirations and its capacity to deliver the required results.

Based upon an assessment of the strategic role of the aerospace industry (chapter 2) and its profile (chapter 3), the Strategic Aerospace Review for the 21st Century (*STAR 21*) has identified five main areas that deserve specific attention: competing on world markets (chapter 4), the operating environment for European aerospace (chapter 5), European governance of civil aviation (chapter 6), the vital need for European security & defence capabilities (chapter 7) and safeguarding Europe's role in space (chapter 8).

STAR 21 aims to broaden understanding of aerospace-related issues in Europe and trigger action which will ensure that its aerospace industry can play a full part in securing Europe's economic and political future. Some of its recommendations require quick policy decisions, while others will be seen in a longer time-scale, but it is important to ensure that the necessary measures are taken. The monitoring and periodic assessment of progress in the areas examined in this report should help identify where further action is needed.



2. Strategic role of the aerospace industry

The aerospace industry has a key strategic role in ensuring a secure and prosperous Europe:

A generator of wealth

In 2000, the European aerospace industry employed 429 000 persons directly and many more indirectly, with a consolidated turnover of €72 300 million. Almost 15 per cent of turnover was spent on research and development. Exporting more than half its output, the industry provided a positive trade balance of about €1 900 million for the EU as a whole. Aerospace depends on an extended supply chain, including many small and medium-sized companies located in all 15 countries of the Union. This complex industrial structure makes aerospace a leading contributor to wealth and employment all across the EU.

Maintaining global competition

Strong European aerospace capabilities have become indispensable to maintaining global competition across a wide range of products. The outstanding example is Airbus, in whose absence airlines would be left with no choice in the most important market segment of the civil aerospace industry. Choice of supplier is also vital for cost-effective government procurement programmes for defence and security.

Home to key skills and key technologies

Aerospace integrates and promotes the development of a wide range of skills, processes and technologies vital to maintaining a broad-based and prosperous economy. Prime manufacturers depend on a network of second and third tier specialist companies to meet their needs. These firms, operating at many different levels of the industry, are home to the key technologies essential for Europe's future.

Driver of innovation

The aerospace industry is a powerful driver of innovation in the economy as a whole. It makes extreme demands on its products, requiring simultaneously safety and reliability, low weight, good economics and minimal environmental impact, enhanced power and high efficiency. The technologies developed for aerospace products provide spin-off in many different sectors.

Services from space

European industry has played a leading role in developing new services which rely heavily on space infrastructures, ranging from telecommunications to navigation and earth observation. Transport, telecommunications, media and other sectors of the economy including public bodies benefit from these capabilities, stimulating in turn innovative downstream activities.

Security and defence

Aerospace is an essential contributor to any national or supra-national system of security and defence. Its products, which include aircraft, space technologies, electronics, engineering systems and sub-systems, are crucial for domestic security as well as providing the capabilities for realising policy aims in neighbouring and in more distant parts of the world. A competitive aerospace sector is vital for any nation or region wishing to maintain full sovereignty over its territory, to exercise political influence beyond its borders and to have available to it the necessary range of political choices and options.

Four governing principles for Europe's aerospace industry

- I. Aerospace is vital to meeting Europe's objectives for economic growth, security and quality of life. It is directly associated with, and influenced by a broad range of European policies such as trade, transport, environment and security and defence.
- II. A strong, globally competitive industrial base is essential to provide the necessary choices and options for Europe in its decisions as regards its presence and influence on the world stage.
- III. European aerospace must maintain a strong competitive position if it is to play a full role as an industrial partner in the global aerospace marketplace.
- IV. Europe must remain at the forefront of key technologies if it is to have an innovative and competitive aerospace industry.

3.

The aerospace industry profile

The European aerospace industry is one of the world's leaders in large civil aircraft, business jets and helicopters, aero-engines and defence electronics. It accounts for one third of all aerospace business world-wide in terms of turnover compared with almost half for US industry.

The industry is difficult for new participants to enter, especially at prime level. Where the technology, the skills and the infrastructure are eroded or disappear, they are extremely difficult to re-create. New entrants are not therefore expected to play an important role in the foreseeable future. In most markets it will be US and European companies which will continue to supply the needs of customers world-wide in what is a highly competitive marketplace.

Certain key factors give the industry its distinctive character:

- close links between civil and defence activities
- cyclical nature of the industry
- high level of capital intensity
- consolidation
- privatisation
- EU-US relationships

Civil and defence links

The two sides of the business are closely intertwined. Major components such as electronics, engines and materials, and also key processes, use similar technologies. The synergy between civil and defence work brings major industrial benefits, creating economies of scale through the absorption of high fixed and non-recurring costs. While the civil aerospace sector has traditionally been dependent

on technologies developed for military applications, military technologies are increasingly being derived from the civil side, which has a much higher rate of new product introduction. Sustaining a viable aerospace industry to serve the needs of civil markets is intimately linked to maintaining its capabilities in the security and defence fields – and vice versa.

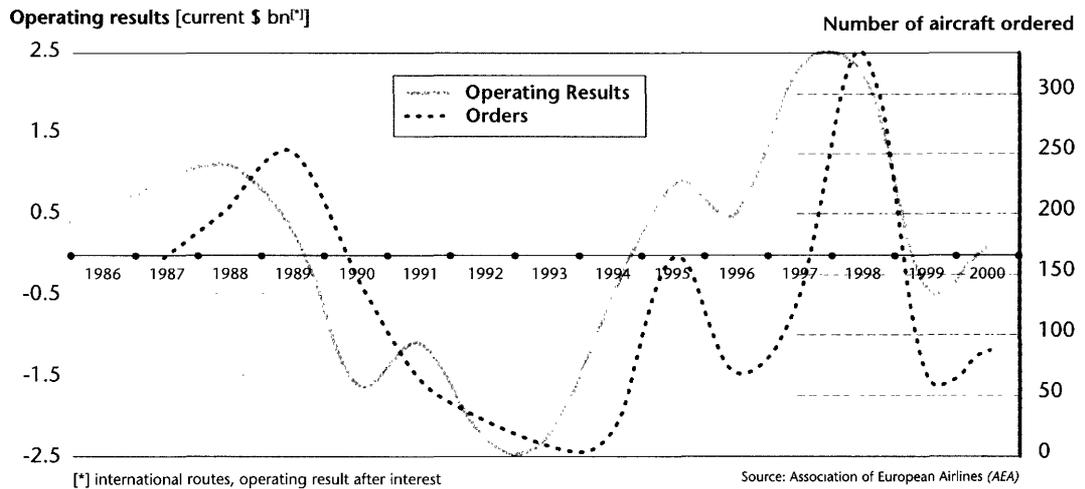
The links between the civil and defence aerospace sectors are poorly understood and recognised within Europe, especially compared to the US.

The industry's cyclical nature

Aerospace is a highly cyclical industry, dependent mainly on the investment decisions of the airlines and on the fluctuating patterns of defence programmes. The strong inter-relationship between the civil and defence sectors in many firms means that in addition to the technological synergies, the different cycles of civil and defence programmes allow companies to balance their development resources more effectively.

The development and increasing market penetration of the Airbus family was an invaluable counterbalance to declining defence budgets in the 1990s. The slump in air transport following 11 September 2001 may pose a similar but opposite challenge, with defence and security requirements offering de facto some counterweight to the slowdown in airline orders.

European Airline Profitability and Aircraft Orders



A capital-intensive industry

Aerospace is a highly capital-intensive industry investing for the long term. The level of investment in research and technology, product development and capital facilities as a proportion of turnover for airframes, engines, ground and airborne equipment exceeds that in many other industries. At the same time, returns are inherently long-term and high risk, which restricts the appetite of the financial markets. As a result government support, including research and development funding, repayable loans and risk-sharing partnerships, has become an essential feature of the business world-wide.

Consolidation in the European industry

The aerospace industry continues to consolidate. The concentration process which began in the US, leaving Boeing, for example, as the only US manufacturer of large civil aircraft, has since extended to Europe, reflecting the call from French, German and British leaders in December 1997 for major industrial consolidation. Companies have seen the need to combine resources in new configurations to meet the challenges of global competition and to

respond to orders for transnational projects, both civil and defence, which are increasingly being undertaken on a pan-European basis.

This process has resulted in significant industrial restructuring across European borders. Development and production of airliners, military aircraft, helicopters, missiles, satellites and aero-engines are now in the hands of major enterprises operating at the European level, such as Airbus, Astrium and MBDA.

Privatisation

In several countries relations between governments and aerospace companies have changed significantly. Formerly state-owned companies are now partly or wholly in the private sector, quoted on stock markets and committed to providing value for their private shareholders. These companies clearly cannot exist only on their restricted home markets and increasingly have developed long-term strategies that make best use of their resources and secure market access on a global scale. This will

often lead European companies to strengthen their non-European links through takeover, merger or outward investment, which could in turn lead to the disappearance of European capability in some sectors and might even endanger European security of supply. Such action can be influenced strongly by access to more attractive funding or taxation regimes.

The mobility of research and industrial programmes in the face of differing international support regimes poses a major challenge for European policy-makers. Enterprises such as BAE Systems, Rolls-Royce, SNECMA and THALES provide examples of European companies undertaking major activities elsewhere in the world.

EU-US relationships

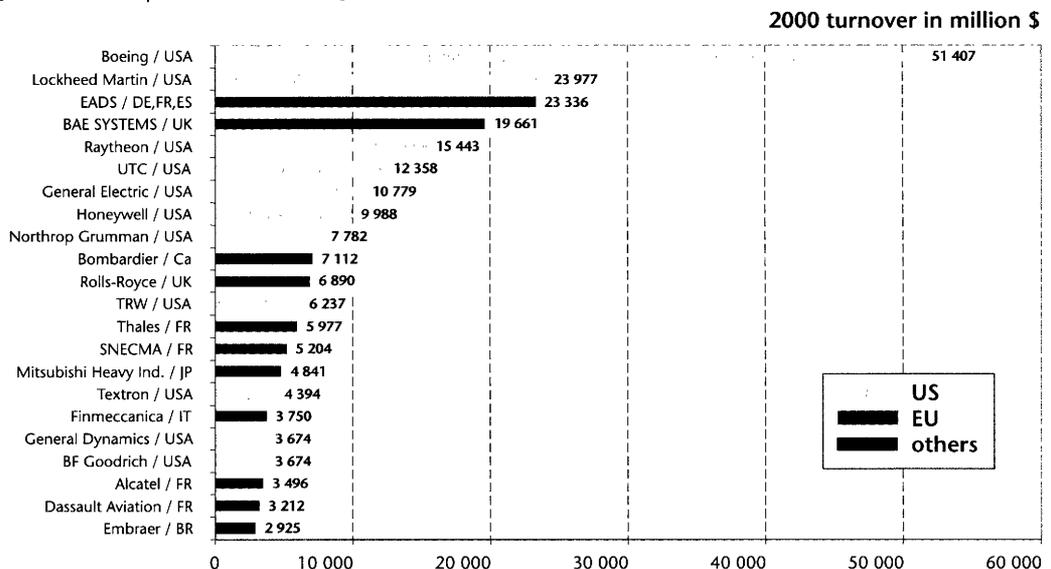
US aerospace companies account for about half of the industry's global turnover. The sales of Europe's industry are just over two-thirds those of US manufacturers. The global dominance of the US industry is particularly evident at prime contractor level.

This industrial structure reflects the advantages of the US aerospace environment. American companies operate in the world's single largest home market. They also benefit from a highly supportive operating framework, which is designed to underpin a declared policy aim which dates back many decades: to maintain US supremacy in aerospace.

It is evident that Europe's policy aims are different from those of the US. This translates into fundamentally different levels of government purchases from the aerospace industry, with the US

Major aerospace industry companies

[Based on aerospace related turnover]



Department of Defense and government agencies buying \$60 300 million of goods and services from US manufacturers in 2000 as against \$15 900 million spent by the 15 EU governments on European contracts.

Another beneficial aspect of US policy is the spin-off from military research and development to civil aircraft programmes and in some cases the direct derivation of civil planes from military projects.

US spin-off from military to civil use

Examples of directly transferring design of military aircraft to civil projects are the B 707 and B 747, where the design teams which had worked on the KC-135 tanker and the C-5A military transport bid transferred to development of the civil aircraft. Another is the civil freighter MD-17, which was derived from the C-17. Design tools used by Boeing in preparing to bid for the Joint Strike Fighter contract were also to be used in civil programmes, according to the company's Chief Executive. In the aero-engine sector, US government-funded development of turbine technology applicable for both civil and military engines may well result in more civil than defence sales.

European companies cannot afford to ignore the tremendous potential that the American market offers. They have to rethink their own future investments. But intense transatlantic competition, especially between Airbus and Boeing, should not obscure the high degree of transatlantic cooperation. This is particularly true for civil aerospace products. Subcontracting and procurement, production, joint ventures and mergers across the Atlantic are natural developments in an industry serving global markets. It is expected and welcomed that such links will play an even bigger role in the future.

The Transatlantic Relationship

- *Airbus procures a large amount of equipment in the US, including engines (GE and P&W) and systems. As a result, up to 40 per cent of a new Airbus may well be made in the US. Development of the A 380 could sustain up to 60 000 jobs there.*
- *European companies are developing and producing major components and sub-systems for Boeing aircraft.*
- *European engine manufacturers like Rolls-Royce, SNECMA, MTU and FiatAvio are involved in engine programmes in both the EU and the US, even on competing products.*
- *CFMI, which is a 50/50 subsidiary of SNECMA and GE, manufactures a highly successful range of aero-engines.*
- *THALES and Raytheon created a joint US-based, 50/50 company (TRS) in 2001.*
- *BAE Systems has an overall \$4 billion business in the US. The company will also have an 8 per cent share in the Joint Strike Fighter (JSF) programme and its development.*
- *Rolls-Royce has significant operations in the US and will also be involved with the JSF development.*

4.

Competing on world markets

Fair conditions in international trade and access to markets are essential pre-conditions for ensuring competitiveness-based growth in aerospace.

Fair conditions in international trade: a level playing field

Operating in a global market place, the European aerospace industry faces strong competition from companies located in other parts of the world, mainly in the US. Given the profile of aerospace, governments have always played an important role in this business. Public support takes differing forms such as protection of domestic markets, support for exports, taxation or direct/indirect funding. Against this background, a fair balance in international support practices and rules is crucial to guarantee a level playing field.

International trade agreements play a key role in this respect. As far as civil aircraft are concerned, two agreements are predominant: The 1979 GATT Agreement on Trade in Civil Aircraft, and the (bilateral) 1992 EU-US Agreement on Trade in Large Civil Aircraft. This agreement regulates precisely the forms and level of government support for both sides, provides for transparency and commits the parties to avoiding trade disputes.

Mutual recognition and respect of international trade obligations, including the implementation of WTO rulings, is necessary to allow balanced competition among aerospace companies in different parts of the world.

Access to markets can be substantially hindered through import and export barriers for foreign companies. This is a particular problem if the protected market is a major one, such as the US

defence equipment market. European manufacturers face two particular problems with US policy:

1. Due to restrictive rules which are embedded in many individual pieces of legislation at both federal and state level, such as the Defense Federal Acquisition Regulations, the US market is difficult to access. In practice this reflects a 'Buy American' policy.

In 2001, US Congress approved legislation in which it explicitly limited the procurement choice of the Department of Defense to commercial Boeing aircraft (Section 8159 of the Defense Appropriation Bill - HR 3338). This piece of legislation would effectively exclude the purchase of an Airbus air tanker even if the enterprise offered a competitive product.

For the foreseeable future, any US Government space payload will have to be launched on equipment manufactured in the US, unless it is exempted by the President or his designated representative.

2. The US has stringent export rules which forbid unrestricted export of equipment by foreign countries if this equipment includes components covered by the US military and dual use regulations. These export controls are being reviewed by the US authorities, but so far on a bilateral basis with selected countries like Australia, Canada and the UK.

As the European industry becomes increasingly transnational, US export control rules need to be relaxed through a dialogue which brings together as many European countries as practicable. This transatlantic dialogue should initially be based upon ongoing bilateral

discussions at industry level with six European countries (UK, France, Germany, Italy, Spain and Sweden) which were signatories of the European Defence Industry Restructuring Framework Agreement established in 2000 by a Letter of Intent (*Lol*) for cooperation in the defence field.

- *Shipment to China of an Astrium APR3 satellite for launch by a Chinese rocket in July 2001 was blocked by delayed provision of export clearance from the US authorities because the satellite included US components. Six receivers on the satellite were to be used by a Chinese operator.*
- *Exported US-built warplanes which are to be equipped with non-US Electronic Warfare Systems must have the equipment installed by the US contractor, which must also supply certain key components. The US Air Force must have insight into total system capabilities and approve the installation.*
- *Dassault Aircraft was denied the licence to integrate the AMRAAM air to air missile on the Rafale for sales to South Korea, thus weakening the offer in the ongoing competition with US competitors.*

Although the European and American industry associations have been working together to resolve some of these issues, further progress can only be made with a clear political will and the involvement of governments. Wherever barriers to trade exist, they should be relaxed to guarantee fair reciprocal market access.

Developing international cooperation

Over the next decades, experts predict a significant change in regional demand patterns. Almost half the demand for civil aircraft over the next 20 years is projected to arise outside the large but relatively mature markets of the US and Europe.

Market access everywhere depends on commercial factors such as quality, price and service, but also on the building of more broadly based political and diplomatic relations. Given its role in international relations, a major responsibility for these issues rests with the EU. The aviation cooperation agreements between the EU and China and the EU and India are examples of strengthening relations. Another is the recently launched EU-Asian Civil Aviation Cooperation project.

Changing market patterns will have an impact on the structure of the aerospace industry. Achieving better access to growing markets may well require moving manufacturing capacity there. As mainly lower added-value manufacturing might move to these markets in the first instance, the established aerospace countries will need to concentrate on sophisticated technologies.

A joined-up approach, which links competitive products and effective marketing from industry with strengthening relationships at the political level, has proven important for aerospace to strengthen its position in world markets. European policies have a major role to play in this respect.

STAR 21 recommendations on world markets

- Ensure a level playing field so Europe's industry can compete fairly in world markets.
- Improve access to world markets, especially that of the US.
- Seek wider agreements to simplify export controls on products with US components.
- Ensure fair reciprocal market access.
- Continue developing international cooperation programmes.

5.

The operating environment for European aerospace

A broad range of policies determines the operating environment for Europe's aerospace industry. Some emanate from the European Union, while others are largely determined at the national level. Areas of major concern for the industry are competition policy, taxation, skills and mobility, enlargement and research.

Competition policy

The process of restructuring in the defence and aerospace industries has led to an increasing number of mergers and other cooperative agreements between companies within the European Union. These industries have passed from a phase of consolidation at national level to a new phase of pan-European consolidation. This development enables European industry to meet the requirements of dynamic competition and increases the competitiveness of European industry, in both civil and defence areas.

European Union competition policy and in particular the Merger Control Regulation provides for a clear framework and quick decisions, facilitating those concentrations and cooperative agreements between companies which do not call into question effective competition. Moreover, EU control of state aids makes it possible to distinguish between those aids necessary for research and technology development and unlawful aids designed to protect uncompetitive firms.

In applying EU competition policy to aerospace there are particular features to be taken into account in individual cases. Such features concern specificities such as market definition, possible dominance, or negative influence on future innovation. In particular as far as defence-related

activities are concerned, relevant aspects might include:

- National government limits on the geographical scope of the markets by procurement rules and administrative procedures (although competition may increasingly be at a European or even a global scale).
- Exercise of the countervailing power of the State as sole customer.
- Instances where Europe may only be able to sustain a single entity capable of competing globally in a phase of pan-European and world-wide consolidation.

Tax incentives for innovation

As part of a wider policy mix, tax incentives for research investment are a stimulus for innovative work which will not deliver immediate returns. Such tax concessions are part of national corporation tax regimes. They vary significantly, both within Europe and compared with other parts of the world. They are an important policy instrument to promote innovation in industries with high research and technology investments such as aerospace.

In Canada, qualifying R&D attracts a proportional tax credit, which is offset against the tax payable on that year's profits. Some provinces have additional incentives. For instance, Quebec gives a tax credit proportional to the amount spent on R&D salaries in the Province.

European countries must recognise the impact which tax incentives for research have on industry's decision where and how much to invest.

A useful avenue would be to analyse the impact of different taxation schemes on aerospace within Europe and to compare them with jurisdictions outside Europe. The long lead times common to high-tech industries and the pan-European nature of aerospace should be taken into account, as substantial differences in European research tax regimes might also distort investment decisions. Possibilities for applying tax and other incentives to promote innovation on a Europe-wide basis should be considered, if necessary through coordinated national actions so as to avoid distortions of competition.

Safeguarding skills

A 'skills gap' in aerospace could prove a major obstacle to the industry's future growth and competitiveness in Europe. Rapid technological change and increased competition underline the need for a creative, innovative and adaptable workforce. Safeguarding and further developing a strong European skills base will be a key factor in maintaining global competitiveness and retaining investment in Europe. The overall performance of education and training systems must therefore be improved, within a lifelong learning perspective, to provide a better balance between initial and continuous vocational training, and to build bridges between different learning contexts. As such, full use should be made of knowledge and skills acquired in both formal and non-formal settings. Signs that highly qualified personnel are proving increasingly difficult to recruit raises particular concerns.

Initiatives to improve the aerospace skills base in Europe

Hamburg's 'Qualification Programme' Task Force:

The regional aerospace and aviation industries, the federal employment office, educational institutions and the City of Hamburg have jointly developed supplementary aerospace training schemes to secure a long-term qualified workforce.

The Qualification Programme encompasses basic apprenticeship schemes ('aircraft electrician' and 'aircraft mechanic') and dedicated advanced vocational training programmes. In February 2002, the first class on aeronautic technology started at Hamburg's public vocational training school for product engineering and aeronautics technology. It has been designed for specialists who already have several years of experience in aerospace. A specific training programme on technical English, aviation law and aircraft technology – supported by the European Social Fund and the City of Hamburg – has been specifically developed for staff from small and medium sized suppliers. The Hamburg University of Applied Sciences offers various programmes on 'Aviation Construction', including a postgraduate programme for fully employed engineers not yet working within aviation. The Technical University Hamburg-Harburg has developed training modules for young professionals already working in aerospace with the support of the European Union.

In Italy similar initiatives have been developed between industry, universities and authorities, specifically in the areas around Turin, Naples and Pisa. They encompass both basic and vocational training schemes.

Actions to tackle the threat of a skills gap need therefore:

- Increased cooperation between a broad range of relevant actors, including public bodies and the industrial partners on different levels to develop and implement measures aimed at improving transparency and recognition of diplomas and certificates, as well as the overall quality of European vocational education and training in terms of standing and reputation. Such measures should include life-long learning schemes and vocational training programmes.
- An effective inter-link between research institutes and the training system.

Facilitating mobility

As the industry consolidates on a European scale, personnel mobility becomes a significant factor. Although workers may be asked to relocate to another country as the tasks move, the absence of a common set of labour laws and regulations in Europe and the limited recognition of foreign academic diplomas are serious obstacles to such cross-border mobility. European aerospace companies with activities in several Member States feel the effects of such inconsistencies. Cross-border programmes such as Eurofighter require considerable worker mobility between specialised production centres located in various European countries. Exemption periods are short and the bilateral character of the existing agreements does not reflect the reality of a truly European industry.

The European Commission addressed these issues in its recent Action Plan for Skills and Mobility and called for immediate action to remove practical, administrative and legal barriers to mobility. The need to improve recognition of qualifications through the development of mutual trust and transparency was highlighted as a priority for action at European level. Aimed at addressing this issue, a process of increased cooperation between the Member States, other European countries and the social partners has been initiated following

a mandate from the Barcelona European Council in March 2002.

The Commission also specifically pointed out the negative effect which the existing social security and pension schemes can produce.

However, as common European social security and taxation systems are not expected to emerge in the near future, targeted remedies which reflect the particular nature of the aerospace industry are needed to improve the existing situation. With regard to taxation systems, thus far only bilateral agreements between individual Member States (e.g. France-Germany) exist, and they are limited in time. They allow the transferred worker to pay taxes in her/his country of residence. With regard to social security systems a Community coordination system is in place guaranteeing social security rights for persons moving within the Union and determining the systems to which they are subject. This is in principle the system of the Member State where they work. There are however some exceptions, such as in case of posting staff from one Member State to another (up to 12 or 24 months). This coordination system is now under review and should be simplified and adapted to new situations.

Security clearance of staff working on defence programmes in different Member States imposes further problems. Existing national legislation has not yet been adapted to the cross-border nature of major aerospace programmes. Such regulation must be streamlined to prevent unnecessary bureaucratic burdens.

Security clearance for personnel working on multinational programmes such as Eurofighter is complicated by different procedures and delays in their countries of origin, which have to provide the clearance for the individuals concerned. The Lol Framework Agreement for Defence Restructuring has provided some relief for visiting staff, but the clearance provided is still not sufficient to meet NATO requirements.

To facilitate the cross-border mobility of the European aerospace workforce several actions are needed:

- Posting periods for social security schemes need to be extended. Airbus experience suggests that at least 12 years would be appropriate.
- The existing bilateral agreements between the social security schemes of individual Member States should be broadened into a wider cross-border European context.
- European aerospace staff working on defence projects in different European countries should be subject to harmonised security clearance procedures.

Enlargement of the EU

Accession to the European Union of countries in Central and Eastern Europe will present challenges and opportunities for Europe's aerospace sector. There is an aerospace industry tradition in countries such as Poland, the Czech Republic and Romania. EU firms have already developed specific business relationships with local companies. Opportunities for risk-sharing and partnership in new programmes have also been discussed.

Sharing common standards is key to strengthening the dialogue. Work is already under way with the aerospace industries of Poland and the Czech Republic to share in-depth knowledge and best practices in areas such as quality control, standardisation and airworthiness. Mutual recognition in these fields and compliance with EU standards is a prerequisite to closer business relationships.

An initiative for training on European civil aviation legislation and Joint Airworthiness Requirements (JARs) in Central and Eastern European countries was launched with the support of the European Commission in March 2002.

The goal must be to develop fruitful long-term commercial and industrial partnerships, to pave the way for strong collaboration and integration with European industry and assist the industry in these countries to become effective partners in the aerospace business. The European Union should look at ways of further fostering this integration process, through, for example, support for training in foreign languages or management skills.

Civil aeronautics research: key to long-term viability

Aerospace requires significant, long-term research commitments, as today's innovation is key to future competitiveness. More than half of the EU Member States support national aeronautics research programmes while at the same time European funding has become increasingly important. European research framework programmes now account for about 30 per cent of all public spending on civil aeronautics research in Europe.

However, the pan-European structure of the aerospace industry and the importance of cross-border projects are not yet reflected in the approach to research funding in Europe. The 6th European Framework Programme, running over five years, proposes to allocate €1 075 million to aeronautics and space research, but Member States will also continue funding their national programmes. More coordination between all different research schemes is needed to overcome the current fragmentation of civil research activities in aeronautics and to minimise unnecessary duplication of effort. As funding levels are tight, such efforts are essential to guarantee the resources needed for major research projects.

In January 2001, a High Level Group led by Commissioner Busquin presented its analysis of the existing situation ("*European aeronautics: A vision for 2020*" - *Vision 2020*) stressing the need for action. The report called for the realisation of a European Research Area in aeronautics, based upon a common understanding of priorities between all stakeholders. First concrete steps have been taken

through the work of the Advisory Council for Aeronautical Research in Europe (ACARE).

ACARE's mission is to establish and maintain a Strategic Research Agenda that will influence all European stakeholders in the planning of their research programmes at both national and EU level, so that they are consistent with the goals of the High Level Group. ACARE will also recommend measures for optimising the use of existing research infrastructures and improving educational policies to attract the workforce that the sector needs.

In addition to improved mechanisms of research and technology acquisition combined with more efficient and effective sharing of tasks, an overall increase in resources is required. The High Level Group estimated that over the next 20 years some €100 billion from all public and private sources would be needed to meet society's needs and to

make European industry a world leader in civil aeronautics. This will also be consistent with the general commitment made by EU leaders in Barcelona to boost Europe's R&D and innovation effort and so close the gap between the EU and its major competitors.

The goals set in Vision 2020 to meet the safety, environmental and operational challenges are very demanding and can only be attained with breakthrough technologies that will need to be fully researched and validated before being committed to production. This will require a significant increase over the current levels of expenditure in civil aeronautics research to a total of €100 billion up to 2020. This investment is in line with the growth of R&D and innovation spending in Europe up to 3% of GDP by 2010 called for at the 2002 Barcelona summit and the projected expansion in civil aeronautics research by the US over the same period.

STAR 21 recommendations for improved operating environment

- The application of European competition policy should continue taking account of specific aerospace features, particularly in defence-related activities.
- The impact of different taxation schemes to promote innovation world-wide should be analysed. Possibilities for applying tax and other incentives to promote innovation on a Europe-wide basis should be considered, if necessary through coordinated national actions so as to avoid distortions of competition.
- The education and training needs of a long-term skilled work force should be recognised.
- Cross-border mobility of staff should be facilitated. Existing problems, particularly concerning social security schemes and security clearance procedures in defence projects should be overcome.
- Schemes of practical training in accession countries should be developed to accelerate industrial integration.
- For civil aeronautics research key stakeholders should define long-term priorities. Future research programmes on European, national, regional and industry levels need better coordination and joint planning where appropriate.
- Allocation of sufficient public resources to sustain a long-term civil aeronautics research strategy requiring an estimated total investment of €100 billion for the next 20 years from all sources, both public and private.

European governance of civil aviation

It was thought in the past that the European Community could limit itself to creating the internal market for the provision of air transport services and leave other regulatory aspects to Member States, but this approach has created an unnecessarily complex environment for the industry as a whole. Caught between Member State and European regulation, it weighs on the efficiency of the European air transport system. Experience has shown that it also weakens Europe's influence in international bodies.

It is therefore time to establish a truly integrated regulatory framework for civil aviation, with particular emphasis on key areas such as air traffic management, safety regulation, security and environmental standards. In the longer term that should lead to European Community membership of the International Civil Aviation Organisation (ICAO), acting under the general UN-framework, so that the EU, together with its Member States, can defend its interests in that forum.

Air Traffic Management and the European Single Sky

The crowded and inadequately managed skies of Europe impose huge problems for the efficiency of Europe's airlines which in turn adversely affect the economics of the aerospace manufacturing industry. The diminished productivity of equipment on predominantly short-haul European services exacerbates the burden of ownership costs, reducing profits and raising fares, while the associated delays make life intolerable for passengers. A High Level Group chaired by Commission Vice-President Loyola de Palacio has already called for a strong, independent regulator capable of managing European airspace across national borders. The Group has also stressed the importance of using new technologies. Based upon

this work the European Commission proposed a package of measures on air traffic management in October 2001 which is currently being discussed in the Council and the European Parliament.

Implementation of these recommendations would help overcome the chronic delays that already affect European air transport and could affect it even more in the future in view of its predicted growth.

The total cost of delays in Europe in 2000 has been estimated at between €2.9 billion and €4 billion, with more than a quarter of flights delayed and an average delay of 43 minutes. 40 per cent of these delays were attributed to air traffic management.

The European aerospace industry has already developed advanced technologies and operational concepts that could help to build up a coherent European Air Traffic Management (ATM) system that is interoperable with existing systems in other parts of the world.

An appropriate forum to develop technical specifications together with industry would be the Industry Consultation Group, which was proposed to provide input from industry and other interested parties under the Single Sky Initiative. This group should be set up without delay. All different activities should be incorporated into an overall master plan.

An effective European ATM approach will be essential if Europe is to be more influential in international bodies.

A single safety regulator

Until now, national agencies have dealt with safety in air transport including the certification of aircraft and components. These activities are coordinated through the Joint Aviation Authorities (*JAA*) system. The *JAA* is an institutionalised framework for Europe's civil aviation authorities to discuss and harmonise national policies. It is not a juridical body with the power to take binding decisions.

As industry has consolidated on a European level, this inter-governmental approach is no longer adequate. It causes bureaucratic burdens for industry without improving safety levels. The European Commission proposal for a regulation establishing common rules in civil aviation and creating a European Aviation Safety Agency (*EASA*) which is undergoing final adoption in the Council of Ministers and European Parliament is an essential move. In contrast to the *JAA* system, this will allow for a single entity to take binding decisions.

With the correct level of empowerment, appropriate delegation from the Member States and operational efficiency, *EASA* should as soon as possible be established as the European one-stop shop for certification, and appropriate agreements should be concluded to enable it to build on the tradition of cooperation with other European countries and major global regulators, such as the US Federal Aviation Administration (*FAA*).

However, national authorities would remain able to pursue their own policy objectives in domains not yet covered by the *EASA* regulation. These include air operations, flight crew licensing, airports and air traffic safety regulation. Industry seeks an agency that over time will be able to play a strong role on an international scene that has so far been

dominated by the *FAA*, so improving Europe's strategic position as transatlantic industrial links continue to grow. In a long-term perspective this could lead to the regulation of safety issues in a transatlantic organisational framework, but to ensure that fair regulations are established, Europe must have sufficient weight to counterbalance the power of the *FAA*.

EASA's remit must therefore be quickly extended to cover the responsibilities which are currently in the hands of national agencies in the individual Member States.

Ensuring security in air transport

In the wake of the events of 11 September 2001, Member States realised the extent of their interdependence and the need to extend their work together to protect civil aviation effectively against terrorist threats.

As a first step, the Community has been given the task of ensuring that common standards of prevention are developed and applied, but more must be done to adapt the means of prevention to the threat, using the resources that new technologies can provide in areas such as cockpit security and encryption.

Such actions should be closely coordinated with the US, so that preventive measures decided on each side of the Atlantic are compatible and do not impose insoluble problems on the industry. In this way European technology would have a new window of opportunity in parallel with American industry, which has been active in proposing solutions.

European approach to environmental issues

Aviation affects the environment mainly through aircraft noise and engine emissions. Aircraft noise is mostly a local issue. It is a major obstacle to the future expansion of many existing airports and thus to growth in the capacity of the air transport system. Gaseous emissions from aviation represented 2 per cent of the overall CO₂ emissions in 1992, and are expected to increase to around 3 per cent of the global total in 2015. Other emissions, including NO_x, have implications with regard to local air quality and climate change, and the altitude at which such emissions occur tends to increase their radiative (global warming) effect.

Significant steps have already been taken to reduce aircraft noise and emissions, but to ensure sustainable development in the industry continued efforts are essential to reduce them further. *Vision 2020* already set the goals for aircraft and engine development over the next two decades with the target of halving specific fuel consumption and reducing NO_x emissions by 80 per cent.

Aviation is a global industry. To avoid distortions of competition between carriers and between manufacturers, environmental issues should be addressed on a global level within ICAO. Europe and its Member States should seek to strengthen their role in that structure to allow effective influence on related decision-making processes.

STAR 21 recommendations for improved governance of civil aviation

There is an urgent need for a strong European organisation to drive the overall policy of the sector. Europe's influence will have to extend beyond its boundaries, working with aviation regulators worldwide. Key recommendations to achieve this aim are:

- **Civil Aviation Authority:** The European Union must take on the role of policy maker and regulator in all areas of civil aviation, speaking with one voice on behalf of Europe in all relevant international organisations and specifically in ICAO. Ultimately this should lead to Community membership in these bodies, together with its Member States. A fully empowered EASA, with rapid extension of its remit, is a first step in that direction.
- **Air Traffic Management:** A master plan for a Single European Sky initiative should be developed within the framework currently discussed in the European Parliament and the Council.

7.

Vital need for European security & defence capabilities

A primary responsibility of government is to protect the citizen. It is now accepted that in many circumstances the provision of this security must be undertaken at European level. Events outside the EU's borders can have profound consequences within the Union. Turbulence in the Balkans has provoked major migratory movements with a direct impact on EU countries, while the events of 11 September 2001 have demonstrated the need to be prepared to meet new kinds of security threat, both internally and on a global basis.

European countries have approached these security and defence needs from three different but inter-related angles:

- The national territorial defence commitments of all Member States continue to play a primary role in their security and defence policies.
- Eleven EU Member States are also members of NATO, which has given high priority to the need to strengthen the capabilities of the European allies so they can be fully effective partners in the Alliance.
- By the Treaty on European Union the EU Member States have agreed to define and implement a common foreign and security policy including the progressive framing of a European Security and Defence Policy (ESDP), thereby reinforcing the European identity and independence in order to promote peace, security and progress in Europe and in the world.

Each of these three approaches calls for increasingly demanding technological solutions. The events of 11 September 2001 further underlined the need for more intensive measures to protect the citizen on both the civil and the defence fronts and complicated the task further. But for Europe to meet more of these needs in civil protection and defence

as signalled in the EU Treaty it must have the capabilities to do so. To a large extent it is the aerospace sector which is required to supply them.

The European or Helsinki Headline Goal already identifies what is needed to deploy the 60 000-strong Rapid Reaction Force. It is too early to make assumptions as to the other goals to be set by the EU Member States for the ESDP, but it is clear that commitments already entered into in the NATO context and at the national level imply major new requirements in a medium and longer-term perspective, bearing in mind that any forces deployed would be available for national, NATO or EU purposes.

The European Headline Goal

"A common European Headline Goal will be adopted for readily deployable military capabilities and collective capability goals in the fields of command and control, intelligence and strategic transport . . . to be achieved through voluntary coordinated national and multinational efforts, for carrying out the full range of Petersberg tasks"

Helsinki European Council conclusions, 1999

Identifying the capability gap

The EU's immediate concerns are to conduct crisis management operations across the whole spectrum of the so-called Petersberg missions: humanitarian and rescue operations, peacekeeping functions and tasks of combat forces in crisis management, including peace-making. In parallel, the Member States concerned will provide the necessary defence means to secure national, European and transatlantic interests within the existing security architecture, in particular NATO.

The need for increased capabilities to meet the European Headline Goal is fully recognised at the EU level and is closely linked with the future of the aerospace industry in Europe. EU Member States have signalled their determination to improve operational capabilities under the European Capabilities Action Plan so they can carry out in full all Petersberg tasks, in particular as regards availability, deployability, sustainability and interoperability. Specifically, they have agreed to pursue their efforts in the areas of command, control, communications and intelligence (C3I), and strategic air and sea transport.

Command and control and intelligence capabilities, using facilities such as unmanned surveillance aircraft and satellite communication systems, are essential for Europe in undertaking Petersberg missions including crisis management in neighbouring countries (in the Balkans, for instance) or elsewhere in the world.

Strategic air transport enables policy-makers in Europe to transfer forces rapidly to more distant destinations for peace-keeping or intervention operations and to provide rapid evacuation from world trouble-spots while minimising casualties.

It has been agreed that within the EU context the progressive framing of a common defence policy will be supported, as Member States consider appropriate, by cooperation between them in the field of armaments. The Laeken European Council in December 2001 acknowledged the importance of improved harmonisation of military requirements and the planning of arms procurement, recording that the EU and the ministers responsible would seek solutions and new forms of cooperation in order to develop the necessary capabilities, making optimum use of the resources available.

Aerospace is thus a key component, both as regards defence applications, and to remedy the capability gap - an essential step for the credibility of the European Security and Defence Policy.

A challenge for Europe

Defence budgets in European countries need to be spent in a more coherent manner. The effectiveness of the traditional coordination and cooperation mechanisms among Europeans is inadequate. European military requirements are not harmonised, markets and purchases are consequently fragmented and too small to allow industry to develop long production runs and become more competitive.

As a consequence of the fragmentation of the defence market, research and technology are neither shared nor of sufficient scale to allow European industry to exploit the best technologies in a consistent way. And whereas European companies are expected to co-fund much of their military research and development, US industry R&D is fully supported, a policy reaffirmed in May 2001.

This combination of factors places huge constraints on European industry in its efforts to remain competitive in key markets. The additional \$40 billion package that the US administration has granted mainly to its defence industry as a consequence of the events of 11 September 2001, in addition to the \$400 billion + budget proposed for fiscal year 2003, could exacerbate this situation further.

The great imbalance between the US and Europe not only distorts competition, but also makes any cooperation or partnership across the Atlantic more difficult.

If Europe is to be credible in foreign and security policy, it requires appropriate European defence capabilities. Military systems need 15 to 20 years from technology assessment to operational deployment. In areas where no significant R&D programmes are undertaken, Europe will have no choice but to give up operational capability in these fields or depend on non-European providers.

Recent events underline the importance for both civil and military crisis management of having efficient and speedy intelligence, command and control processes and accurate weapons systems with no collateral effects. Such requirements call for innovative and complex solutions, whose development may involve feasibility experiments and demonstrators, leading to a new generation of equipment in key areas such as search and rescue, reconnaissance, C3I systems, unmanned air vehicles and smart munitions. Unless Europe maintains these capabilities and develops them further, there is a real risk that Europe's ability to act will be determined by the US through its dominance over the supply of certain types of equipment, or support to systems already delivered.

There is a high risk that if the EU Member States do not increase their commitment to their aerospace industry and address these issues at a European level, they will limit the Union's autonomous ability to carry out even the basic Petersberg Tasks, to say nothing of obligations which individual Member States have in NATO.

The new electronic environment

The nature of warfare is going through fundamental change, driven by the need to maximise the efficient deployment of military forces, increase surveillance against the threat of terrorism, give a flexible response to such a threat and recognise the vital need to minimise military and civilian casualties resulting from military action. This scenario involves the use of unmanned aircraft systems for both surveillance and force projection.

Much of the technology required for this new capability is generic. Deployment of unmanned systems can provide a reliable and cost effective means of surveillance and data management for fisheries protection, border patrols, law and order enforcement, civilian search and rescue and many other applications with considerable market potential. Both civil and defence applications can and should be met by the European aerospace industry.

The US has so far made the greatest advances towards building this electronic environment and in development and deployment of unmanned systems. Unless Europe can build its own independent capability in this area, albeit at an affordable lower capability level, there will be severe limitations both in terms of being able to play a significant role in military operations alongside the US or, most significantly, being able to mount independent actions. The key issue here will be interoperability amongst the European countries as well as with the US and NATO.

A new approach to Europe's defence needs

Of all economic sectors, defence equipment is the only one within the European Union to remain largely governed by national policies. Definition of future requirements and procurement of current needs are frequently carried out on a purely national basis with little regard to common interests. This is expensive and inefficient, duplicating effort and raising costs at a time when budgets are squeezed. It is clear that:

- A fragmented market denies Europe the economies of scale necessary to reduce costs, fund R&D and ensure the effective application of technology.
- Traditional methods of cooperation within Europe do not provide best value for money.

Development of common objectives in foreign policy and cooperation in security operations need to be matched by common objectives and cooperation in the design and the acquisition of the tools. Work should accelerate on harmonising military requirements and the planning of arms procurement, as recommended at the 2001 Laeken Summit, with the aim of developing a comprehensive armament policy at the EU level. Initiatives for common procurement in organisations such as the Joint Armament Cooperation Organisation (OCCAR) and the Western European Armaments Group (WEAG) need to develop more quickly.

Rationalisation of spending will not however be enough to cover the needs of the new security agenda. Additional resources will be needed and these new demands come just as several European governments have set out to restructure their armed

forces to adapt them to a new strategic environment where the military demands are different. Restructuring costs money though, and any potential savings will not materialise for some time. The comprehensive approach to crisis management which is a feature of the Common Foreign and Security Policy will call for expensive new capabilities, including policing.

European freedom of action comes at a price in terms of the appropriate equipping of European armed forces as well as the creation of a strong industrial and technological base. This is why decisions on the level of national spending on defence equipment, re-setting of priorities within existing defence budgets and the appropriate response to new threats should all be approached in a European context. Furthermore, the current limited commitments to pooled defence R&D projects should be expanded and should include large collaborative demonstrator programmes which bring together activities from different Member States to create a strong defence research framework.

The commitment of the Member States and the EU to an efficient defence structure, appropriate to Europe's new strategies and priorities and increasingly autonomous, call for a European armament process which comprises:

- Formulation of a common European armaments policy based on a sustainable defence technological and industrial base, with development of effective R&D programmes to meet the defence and security needs identified for Europe's Common Foreign and Security Policy and to enhance European capabilities within the North Atlantic Alliance.

- Promotion at the level of all Member States of efficient arrangements for armaments cooperation based on best examples derived from the Lol Framework Agreement for Defence Restructuring.
- Creation of a coherent EU framework to shape an integrated European defence equipment market allowing industry to exploit economies of scale and to deliver at an affordable price the equipment and services required by the European common policies and the export market.

However, such structural improvements will not be sufficient in themselves to provide the new capabilities needed to meet the strategic goals of Europe's leaders. The ever-widening defence and security commitments of European countries call for the allocation of increased resources. The inevitable conclusion is that overall spending must be increased.

An internal market in defence equipment

Since the competitiveness of the European aerospace and defence industry is vital to the credibility of European security and defence objectives, existing instruments should be used wherever possible to eliminate those policies and practices that prevent European defence companies from working more efficiently.

Consolidation of the European aerospace and defence industry goes together with growing transfers of products, components, intermediate goods and raw materials, whether between independent companies linked by a customer/supplier relationship or between undertakings or factories belonging to the same

group. In either case it is important to ensure that goods can circulate within the single market in such a way that the competitiveness of restructured European companies is not compromised. As well as administrative simplification, this is a matter of introducing procedures which allow goods and components to circulate more rapidly – a necessity for the modern, flexible management of enterprises.

Action to facilitate the free circulation of defence goods through simplification of the controls associated with intra-Community transfers and the harmonisation of customs duties is a pre-requisite for the creation of the integrated Single Market which is a cornerstone of the added value of the EU dimension.

Policies developed for the Single Market where the EU has extensive regulatory experience, such as public procurement principles, may also be relevant for creating a single market in defence equipment, especially in the context of a developing European armaments policy, where the special characteristics of defence equipment are taken into account.

The European Parliament has supported this approach. In April 2002 it adopted a Resolution on European defence industries reiterating its view that a strong, efficient and viable European armaments industry and an effective procurement policy were vital to the development of the ESDP. It also reaffirmed its support for the Action Plan contained in the Commission's 1997 *Communication on Implementing European Union Strategy on Defence-Related Industries*, which called for urgent restructuring in the sector and the creation of a European defence equipment market.

In calling for an updated Action Plan to be submitted to the Council and Parliament as soon as possible, Parliament has asked the Commission to consider how far the common commercial policy and single market disciplines should be applied to defence industries, the possibility of developing a multi-institution and defence industry body to pool and coordinate research in the defence field in a similar way to ACARE, and whether further measures are needed to facilitate the establishment of transnational companies and integrate the industries in the accession countries.

For the longer term, the Convention on the future of the European Union provides an opportunity to identify the most effective institutional and operational arrangements to achieve the Union's objectives in the defence field and thus also reinforce the competitiveness of the European aerospace and defence industry.

STAR 21 recommendations in the defence sector

- Ultimate goal: a European armaments policy to provide structure for European defence and security equipment markets, and to allow a sustainable and competitive technological and industrial base.
- Harmonisation of military requirements and planning of procurement budgets and of arms procurement.
- Increased resources, used more effectively, with encouragement for European collaborative programmes and more effective task-sharing between Member States.
- More coherent defence research spending between Member States.
- Work towards establishment of a European defence equipment market and an armament agency responsible for a wide range of activities related to acquisition, common research and development, off-the-shelf procurement, etc.
- Promotion of EU-wide actions similar to the Framework Agreement for Defence Restructuring.
- Bridging the gaps identified in the European Headline Goal and in the collective capability goals.

8.

Safeguarding Europe's role in space

Over the past 40 years Europe has developed significant space capabilities through its spacecraft and launchers and the ground infrastructure to support them. These are now essential tools for the well-being and the security of European citizens. They are key to many applications in both the civil and the defence fields and their importance continues to grow rapidly. Space applications are making an essential and expanding contribution to EU policies, such as environment, transport, agriculture, and development. The evolving Common Foreign and Security Policy and implementation of Petersberg Tasks also call for capabilities which require the use of space technologies.

These applications depend upon European capabilities in three inter-related areas:

- use of space for earth observation, navigation, telecommunications
- space science
- access to space

Importance of space applications

The strategic importance of space for Europe has been widely recognised. Since the European Space Agency (ESA) was created for European collaboration in civil space activities in 1975, one of its main goals has been to deliver a better understanding of the earth and of the universe by developing and operating specific programmes. Through such multilateral programmes, combined with national efforts, Europe has developed significant capabilities in spacecraft technology. Similarly, the Ariane family of launchers has been developed to provide an autonomous access to space.

Satellite monitoring can track changing weather and environment patterns and will help to define, implement and police Europe's international commitments such as the Kyoto Protocol to the UN Framework Convention on Climate Change. Global positioning will bring major improvements to the safety, efficiency and inter-modality of European transport by providing precise information on location and navigation. Satellite telecommunications services have potential for enhancing communications systems in Europe.

In 2000 the European Commission (EC) and ESA set out a joint European Strategy for Space and created an EC/ESA taskforce. Two joint programmes are particularly important in the near term, the Galileo global positioning system and Global Monitoring for Environment and Security (GMES).

Galileo is a European satellite radio-navigation programme based upon a constellation of 30 satellites across the globe, with local ground receivers to provide services to users in virtually all locations. It will be compatible and complementary with GPS, the system operated by the US Department of Defense. EU ministers have approved the development phase of the project, which will run until 2005, to be followed by deployment and operational phases. Operational target is 2008.

GMES is a European initiative launched in 1998 which will benefit from existing and planned satellite research facilities to create an operational system for space-based information. The monitoring capabilities will include global change, environmental pressures and possible security applications if these are required under the EU Common Foreign and Security Policy.

Challenges facing Europe's space industry

Space activities include applications of purely commercial interest in the civil sector, especially telecommunication satellites. For the past 10 years, the space sector in Europe has invested heavily to benefit from significant growth generated by this commercial market, while in the US the profitable programmes have been essentially institutional. The recent rapid decline in the market for telecommunications – and consequently in the launcher market – is endangering the European space industry's viability. The decline coincides with a decrease in government space budgets which threatens funding to space agency programmes in Europe.

The European space industry's high level of dependency on the commercial market contrasts with the US, where the major share of income is derived from government-funded programmes. Increasing US public investment in its space industry will continue to put pressure on Europe's industry – global dominance in space equipment and applications is a declared US policy goal.

The figures highlight the situation: in 1999, turnover of US aerospace companies from space activities was €33 700 million, of which €26 000 million – more than three-quarters – was funded by the Department of Defense and NASA. European companies, by contrast, had turnover of less than €5 500 million, of which only half came from institutional sources, the rest coming from the competitive, commercial market-place.

Moreover, defence programmes have been conducted nationally or bilaterally (and only rarely multilaterally) in Europe, with some major successes

but limited budgets – less than 5 per cent of the US total for industry even when combined. Efforts to give more support to European collaborative projects have not so far led to results and their future remains uncertain. As a consequence, in contrast to civil space programmes, there is as yet no structure at the European or multi-lateral level to address Member States' security and defence space technology needs.

If Europe does not respond to these challenges, the consequences will be profound and quite possibly, irreversible. It could lose its independence in key strategic and commercial satellite technologies, such as navigation, communications, or earth observation, both civil and military, as well as in access to space. The EU's choice of policy options and its major industrial role in this strategic high technology field would be put at risk and it would become dependent on others. It could in turn lose its position in commercial and service sectors which depend on space capabilities.

Need for a dynamic policy for space

A dynamic long-term European Space Policy, as advocated by the EC/ESA Joint Strategy, should comprise certain key elements:

Galileo: Now that the go-ahead for Galileo has been given by the Council of the European Union, the next step is to ensure that the infrastructure is completed and then to move on to operation and exploitation. Careful attention must be given to the resulting implementation by clearly identifying the additional infrastructure and the service definitions for the project in terms of public funding for the infrastructure and industry participation for the services.

Galileo will bring a wide range of benefits to aerospace industries and to the European economy as a whole and keep European industry at state-of-the-art level in space technologies. It will also provide a world-wide operating system complementary to other existing navigation systems, which could provide a secure fallback if needed.

GMES: This key initiative should be developed rapidly to ensure that Europe has an independent, autonomous and operational global monitoring capability for policy needs relating to environment and to security.

A full GMES programme must be established by the beginning of 2004 in accordance with the Council Resolution of December 2001 if goals are to be met for an operational and sustainable capability by 2008. As a first step, early large-scale prototypes are required through networking between space and non-space infrastructure, supported by the necessary budgets in the European research framework programme and ESA programmes and by actions to ensure that a suitable institutional structure is established for gathering and making accessible space-based information for environment and security.

Meeting EU security objectives: Space applications could support several objectives under the Common Foreign and Security Policy, supplementing the Member States' own resources, including information-gathering, communication and verification, but an integrated approach will be needed from all the interested parties – Member States, European Commission, Council and NATO – if specific or shared capabilities are to be developed.

The priorities are:

- to make use of the existing and planned infrastructure, which is mainly national but includes the EU Satellite Centre, to support the Petersberg tasks of humanitarian aid, rescue and peace-keeping. The security elements of GMES should be dedicated to that objective;
- to continue building a space defence and security information capacity in Europe for surveillance, reconnaissance, command and control, telecommunications and positioning, benefiting from Europe's space assets and broadening the experience of the Satellite Centre;
- to encourage NATO to consider a European solution when commissioning its military telecommunications satellite and launch needs.

Space science and R&D: Space science should be supported, such as space exploration, earth sciences and micro-gravity sciences (e.g. biotechnology research) as well as its applications based on innovative data processing, models, etc. which are needed to develop new operational space missions and services. Space agencies and the EU should support wide-scale demonstrators integrating the various space and ground technologies.

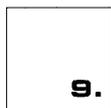
Sustaining European launch capabilities: An independent and competitive launch capability to provide access to space is a pre-requisite for achieving a consolidated European Space Policy and successfully exploiting space. Unfortunately, due to the marked decline in telecommunications satellite launches which represent most of the Ariane

market, commercial launches together with the limited complement of launch contracts from European governments are insufficient to sustain a viable business case for the Ariane system. Public support from ESA and the EU Member States is therefore vitally important as regards Ariane launcher upgrades, new developments and launch facilities, while industry works to reduce costs and to improve the efficiency of production. Rapid action is essential at European level if Europe is to compete on level terms with the government-funded US launcher industry.

EC/ESA framework: Having defined an overall strategy for the short and medium term, the EC and ESA must implement it as soon as possible. For defining a European Space Programme, EC/ESA should also develop a long-term approach with adequate funding, establishing appropriate institutional mechanisms taking full account of user needs and providing visibility to such users, investors and third countries.

STAR 21 recommendations on space

- Develop a consolidated European space policy in line with the ESA-EC communication on space, to include a plan of action and adequate funding.
- Deploy Galileo on schedule, devoting adequate resources to world-wide promotion and development of downstream activities, providing opportunities for an early involvement of the private sector.
- Develop GMES to ensure autonomous global monitoring capability, through a significant support from EC and ESA programmes.
- Develop a fully European-based space defence and security capability for surveillance, reconnaissance, command/control including telecommunications and positioning.
- Adapt public support for maintaining a European independent and competitive access to space.
- Adapt public support to space science and the development of its applications.
- Support wide scale demonstrators integrating the various space and ground technologies.



9. Concluding remarks

The Advisory Group on Aerospace believes that Europe's aerospace sector is at a critical phase. This is an industry which must operate in a long-term perspective of 20 to 30 years. Accordingly, the policy framework which is established today and the resources which are allocated now will determine the perspectives and performance of the industry for decades to come. If Europe is to remain a flourishing centre of excellence for aerospace in an intensely competitive world market in which US companies have the benefits of a massive home market and strong government support, then comparable opportunities in keeping with Europe's goals must be available at the European level. Otherwise Europe risks losing vital capabilities.

This is not to argue that the EU should seek to match the expenditure levels of the US when it comes to aerospace and defence. Such levels of

spending will necessarily differ in function of respective strategic visions, goals and priorities, and the choice of instruments to achieve them. Nevertheless, the political choices to be made in relation to Europe's role and influence in the world are inseparably linked to the ability to guarantee the means and the capabilities to realise its goals. A competitive European aerospace industry is essential in providing these means and capabilities.

The Group invites the widest possible response to its analysis and recommendations. It looks forward in particular to the reaction of those parties which are best placed to give effect to its recommendations, namely, the Member States and the Community Institutions. In the light of these reactions and other relevant developments, the Group stands ready to further contribute to the discussion.



Summary of STAR 21 recommendations

Competing on world markets

- Ensure a level playing field so Europe's industry can compete fairly in world markets.
- Improve access to world markets, especially that of the US.
- Seek wider agreements to simplify export controls on products with US components.
- Ensure fair reciprocal market access.
- Continue developing international cooperation programmes.

The operating environment for European aerospace

- The application of European competition policy should continue taking account of specific aerospace features, particularly in defence-related activities.
- The impact of different taxation schemes to promote innovation world-wide should be analysed. Possibilities for applying tax and other incentives to promote innovation on a Europe-wide basis should be considered, if necessary through coordinated national actions so as to avoid distortions of competition.
- The education and training needs of a long-term skilled work force should be recognised.
- Cross-border mobility of staff should be facilitated. Existing problems, particularly concerning social security schemes and security clearance procedures in defence projects should be overcome.
- Schemes of practical training in accession countries should be developed to accelerate industrial integration.

- For civil aeronautics research key stakeholders should define long-term priorities. Future research programmes on European, national, regional and industry levels need better coordination and joint planning where appropriate.
- Allocation of sufficient public resources to sustain a long-term civil aeronautics research strategy requiring an estimated total investment of €100 billion for the next 20 years from all sources, both public and private.

European governance of civil aviation

There is an urgent need for a strong European organisation to drive the overall policy of the sector. Europe's influence will have to extend beyond its boundaries, working with aviation regulators world-wide. Key recommendations to achieve this aim are:

- **Civil Aviation Authority:** The European Union must take on the role of policy maker and regulator in all areas of civil aviation, speaking with one voice on behalf of Europe in all relevant international organisations and specifically in ICAO. Ultimately this should lead to Community membership in these bodies, together with its Member States. A fully empowered EASA, with rapid extension of its remit, is a first step in that direction.
- **Air Traffic Management:** A master plan for a Single European Sky initiative should be developed within the framework currently discussed in the European Parliament and the Council.

Vital need for European security and defence capabilities

- Ultimate goal: a European armaments policy to provide structure for European defence and security equipment markets, and to allow a sustainable and competitive technological and industrial base.
- Harmonisation of military requirements and planning of procurement budgets and of arms procurement.
- Increased resources, used more effectively, with encouragement for European collaborative programmes and more effective task-sharing between Member States.
- More coherent defence research spending between Member States.
- Work towards establishment of a European defence equipment market and an armament agency responsible for a wide range of activities related to acquisition, common research and development, off-the-shelf procurement, etc.
- Promotion of EU-wide actions similar to the Framework Agreement for Defence Restructuring.
- Bridging the gaps identified in the European Headline Goal and in the collective capability goals.

Safeguarding Europe's role in space

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- Adapt public support for maintaining a European independent and competitive access to space.
- Adapt public support to space science and the development of its applications.
- Support wide scale demonstrators integrating the various space and ground technologies.

This review was prepared by the European Advisory Group on Aerospace and published on their behalf by the European Commission.

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