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Lessons learned from European defence equipment programmes

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Lessons learned from European defence equipment programmes

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This Occasional Paper is based on a study performed by a Consortium comprising the Institut de Relations internationales et stratégiques (IRIS), the Centre for European Reform (CER), the Deutsche Gesellschaft für Auswärtige Politik (DGAP) and Istituto Affari Internazionali (IAI), under a contract financed by the European Defence Agency (EDA). The opinions and statements in this study are not necessarily endorsed by the EDA. This paper was published under the aegis of the EUISS under the supervision of Research Fellow Daniel Keohane.

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This Occasional Paper explores the issue of European armaments cooperation. Such cooperation between countries has often been difficult. Even so, European governments continue to collaborate on multinational equipment programmes for a number of reasons, and successful multinational programmes have manifold benefits. These benefits include, for instance, the possibility of meeting a capability requirement at an affordable price. Collaborative programmes allow greater economies of scale because of the larger order books. These savings also allow European governments to contemplate acquiring more advanced equipment (and share development costs), despite static defence budgets. Another advantage is the fact that common equipment can help countries work together on international missions: such interoperability is vital for the success of military coalitions. Also, governments gain political benefits from cooperation, and are perceived to be constructive EU partners. Moreover, multinational procurement encourages greater convergence of thinking about international security among EU governments, and this helps foster a common European strategic culture. Other positive side effects include technology sharing, technology development, common standards, integrated logistics and successful exports.

This paper also discusses the challenges facing European arms cooperation, especially in the fields of juste retour, industrial consolidation and static defence budgets, research, technology and redundant industrial skills. Different national defence industrial policies make it difficult to develop common approaches to armaments cooperation. In particular, government protection of national defence industries has been one of the main problems in past cooperative programmes. Work-share arrangements, known as juste retour, guarantee that a national defence industry must receive work worth the full amount of its government's financial contribution to a programme. Experience shows that the more governments and industrial interests are involved, the more difficult the cooperation. Governments also have vastly different types and sizes of defence industries. Six countries (France, Germany, Italy, Spain, Sweden and the UK) account for more than 90 percent of defence equipment production in the EU. Most governments, therefore, are primarily consumers rather than producers - although many smaller countries are major sub-contractors and component suppliers.

Some parts of Europe's defence industry have consolidated across borders (aerospace, IT). But the industry must consolidate further if Europe wants to play a significant role in the global defence industry. EU governments collectively spend roughly €190 billion on defence each year, but national defence budgets are either static or falling. Plus the governments only spend roughly €40 billion each year on procurement, research and development. Static defence budgets and low equipment spending means that a competitive defence industry is not sustainable on a national basis anymore.

Slow progress in cross-border industrial consolidation also means that there are numerous redundant industrial skills across Europe. Some governments waste scarce

procurement and development money on sustaining certain defence technologies nationally, which are usually too small or unsophisticated to be internationally competitive - thereby aggravating the problem of over-capacity. In sum, EU governments have little choice but to collaborate more on equipments programmes, and to manage those programmes more efficiently.

Key recommendations

The following are the principal recommendations that emerged from this survey of European defence equipment programmes, covering five key areas.

<p>1. Requirements</p> <p>► Establish a common requirements process EU governments have agreed on a number of capability goals (Headline Goal 2010) and established a ‘Capability Development Mechanism’. The governments need a common requirements process to complement these initiatives. Governments can draw on the common requirements methodology already used by the six governments that signed the Letter of Intent (LoI) in 1998. The EDA should organise this inter-governmental exchange on shared requirements, working closely with the EU Military Committee and NATO.</p> <p>► Promote convergence of elements of military doctrine of the participating Member States (pMS) A common military doctrine would be the most efficient way to achieve common requirements, but this seems unlikely for the foreseeable future. However, as the EU is carrying out more operations each year, over time governments are likely to agree on some elements of a European military doctrine in line with the Petersberg Tasks.</p> <p>► Involve industry from the beginning Defence ministries and military staffs should focus mainly on the functional/military requirements and mainly encourage industrial players to propose different technical solutions (especially for more sophisticated systems). Industry should be involved in the</p>	<p>requirements definition process from the beginning. Not only can industry provide expertise on technical requirements, but they can also advise on delivery timelines. Plus industry can help develop shared requirements by proposing the same solutions (including ‘off-the-shelf’ solutions) for different national needs.</p> <p>► Apply a ‘through-life’ approach Increasingly, governments plan cooperative programmes under a ‘through-life-approach’, including maintenance, training, logistics and operational use and disposal. This is necessary because the in-service cycle usually costs at least half as much as the acquisition cost. ‘Through-life’ is also important to help ensure future interoperability on joint EU missions.</p> <p>2. Research and Technology</p> <p>► Exchange information on R&T planning Closer European cooperation on military research can only help strengthen procurement cooperation, because successful research programmes are likely to lead to successful procurement programmes. Governments need to exchange more information about their existing research projects and their future research plans to avoid duplication. The EDA should facilitate this information exchange and link it to the capabilities Headline Goal process and its efforts to map European industrial and technological capabilities.</p>
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► **Establish an R&T ‘Headline Goal’**

EU governments already have a Headline Goal of capability targets they are supposed to meet by 2010. They should develop a similar ‘Headline Goal’ for European defence research, a list of targets that governments should meet by 2020. This would provide much needed guidance to industry and encourage more cross-border collaboration on joint research projects.

► **Boost European defence research programmes**

Given their limited research budgets, and potential economies of scale, governments should cooperate more on joint research projects. The governments should boost the EDA’s research budget (currently €3 million), multiplying it exponentially so that it can – with pMS approval – initiate pilot projects on a broader range of technologies. The EDA should also work closely with the European Commission, because some of the projects that will be funded by the Commission’s ‘security research’ budget (under the 7th Framework Programme) may have military uses as well (‘dual-use’ technologies).

3. Industrial cooperation

► **Phase out *juste retour* within 10 years**

Juste retour is the single biggest obstacle to smoother cooperation on joint European programmes, but it would be difficult for governments to scrap *juste retour* arrangements in the short term – even if the OCCAR ‘global balance’ system is an improvement on previous arrangements. But EU governments cannot afford *juste retour* on limited defence budgets, plus Europe’s defence industry is increasingly cross-border. Governments should gradually phase out *juste retour* arrangements for future cooperative programmes within 10 years. This would encourage much greater industrial consolida-

tion and technology specialisation across Europe, and focus procurement on choosing the best company with the best product for the right price.

► **Extend security-of-supply agreements**

One reason governments have kept *juste retour* is to ensure the security of their defence equipment supply. Thus, before phasing out of *juste retour*, governments would rightly want assurances about their security of supply. The governments, therefore, should agree to extend the existing LoI security-of-supply agreement (signed by 6 governments) to all the EDA participating Member States (pMS).

► **Extend the procurement code of conduct to multinational programmes by 2010**

Governments could encourage further industrial consolidation by extending the EDA’s voluntary procurement code of conduct to future multinational programmes (they are currently exempt) by 2010. This would help increase the transparency of the tender procedure for multinational programmes and encourage more joint tenders and competition for contracts, which should help keep prices down.

4. Budgets

► **Exchange information on national budget procedures**

Budget procedures differ greatly from country to country. To help co-ordinate national budgets for cooperative programmes, the EDA should facilitate an inter-governmental information exchange on different national procedures.

► **Use multi-annual programme budgets**

To overcome the persistent difficulties involved in using national budget procedures – such as timescale and procedural differences – which often lead to budget shortfalls during pro-

grammes, governments should create a collective multi-annual project budget for each future cooperative programme. Integrated project teams (see next section) should manage at least some of the money in this budget, and each government would contribute according to its degree of involvement in the programmes.

► **Make upfront investments and establish ‘risk budgets’**

The governments should also invest an adequate amount of their programme budget – as a rule of thumb between 10-15 percent – at the front-end of the programme, during the demonstration and development phase. Testing technology thoroughly at the start of a programme can help save money later, and allow governments to be firmer about delivery dates and in-service planning. Governments should also set aside a collective ‘risk budget’ (the amount would depend on the complexity of the programme), to cover any unforeseen emergency costs during the production phase of a programme.

5. Project management

► **Use integrated project teams (IPTs)**

The most successful project management is conducted by an ‘integrated project team’. This team should integrate national experts and be permanently based at one venue. IPTs should be given authority for day-to-day decisions although national capitals should keep authority over strategic decisions. The project teams should be experienced and represent a range of backgrounds (i.e. technology, industrial, finance, legal, logistics).

► **Focus contracts on delivery**

The traditional focus of programme contracts has been on meeting ‘phases’ of programmes, rather than on final delivery. If industry is involved in the requirements definition phase

from the beginning and governments are prepared to invest more money upfront in the research and development phase, then the focus of contracts should shift from predominantly meeting phases to final delivery of the product.

► **Prefer prime contractors and ensure transparency for sub-contractors**

Prime contractors are generally preferable to joint ventures because it should make it easier to clarify the allocation of risk between a group of governments and one company (rather than a group of companies). However, prime contractors must also be clear about allocating risk with their sub-contractors. Governments need to build on the EDA’s Code on Best Practice (which forms part of the procurement code of conduct) and reach an inter-governmental agreement to guarantee transparency through the whole supply chain both from industry and the governments and fair access to second tier companies.

► **A European patent-style system for defence intellectual property rights**

Intellectual property rights (IPR) often complicate cooperative programmes, because it is not always clear who owns the IPR. Governments should set up a secure Europe-wide patent-style system for defence IPR, covering both attribution and transfer of IPR, which would help foster a common market for defence technology ideas and innovation and takes into account the sensitivities of defence IPR (which does not come under normal commercial IPR patent rules, i.e. the European Patent Office). These rules should simultaneously take into account three aspects: the governments’ need to control the spread of technology and guarantee security of supply; the incentives for prime contractors to innovate and adapt different technologies; and the imperative for sub-contractors to protect their niche capabilities.

Introduction

1.1 Objectives of the study

At the end of May 2006, the European Defence Agency asked a consortium led by the IRIS (Institut de Relations internationales et stratégiques) in Paris and including the Centre for European Reform (CER) in London, the Deutsche Gesellschaft für Auswärtige Politik (DGAP) in Berlin and the Istituto Affari internazionali (IAI) in Rome, to conduct a study on ‘Cooperative lessons learned and best practice: how to launch a successful cooperative programme’. The objective of the study was to:

- Identify the successes and failures of past European defence cooperation programmes and recommend how to improve future cooperation.
- Produce a concise guide on ‘how to launch a successful cooperative defence programme’ that could be used by both Government and Industry.
- Produce a Study Summary Report and an overall Study Report.

The essential aim of the study was to identify best practice for cooperative programmes and to make a number of recommendations to improve European armaments cooperation.

1.2 Methodology

The study methodology was based on personally-conducted interviews, seminars held on a national basis and questionnaires sent out to participating Member States (pMS). The initial questionnaire, agreed with the European Defence Agency (EDA), was used as a guideline for the interviews and the seminars to gain comparable results.

The study is based on four focus areas:

- Requirements
- Budgets
- Management
- Industrial Cooperation.

The authors conducted an initial review of their mid-term results with representatives from the pMS and industry on 5 July 2006 at the EDA, with a general discussion and individual workshops on the four focus areas. A second review with representatives from the pMS and industry, with a presentation of drafts results, was held at the EDA on 14 September 2006.

The authors agreed on a list of ‘case studies’ to conduct in-depth analysis of lessons learned with the EDA. It includes a full range of cooperative programmes covering land, sea and air environments, and also considers a range of project phases from those successful in the requirement definition phases to those unsuccessful in the requirement definition phase, to those continuing into the in-service phase.¹

¹ The list contains the following programmes: (i) A400M; (ii) Storm Shadow/Scalp; (iii) Horizon (including PAAMS); (iv) Cobra; (v) Eurofighter; (vi) Trigat MP; (vii) MRACV-GTK; (viii) NATO satellite communications; (ix) Nordic NH transport helicopter; (x) nEUROn Demonstrator; (xi) FREMM; (xii) Future Aircraft Carrier / PA2; (xiii) Meteor; (xiv) FSAF; (xv) Aster; (xvi) Tiger Helicopter; (xvii) APA Radar System for F-124 and LCF; (xviii) Case Telescoped Ammunition (CTA) 40 mm.

As agreed with the EDA, a series of interviews were conducted with defence ministry officials across Europe. 114 interviews were held in France, Germany, Italy, Sweden and the UK; 4 seminars were conducted in France, Germany, Italy and the UK; and a questionnaire was sent to the 24 pMS – 9 of which (excluding the ones where we conducted interviews) sent back answers.

The people interviewed included: MoD officials (including procurement agencies, logistic organisations, military staff); representatives of industry; academics and think tank experts. The level of persons interviewed was a mix of senior-level (policy officials and industrial executives) and working-level (project managers). The study was completed in December 2006.

1.3 *Outline of this Occasional Paper*

This *Occasional Paper*, based on the overall study report, is divided into three chapters. The first explains the reasons why European governments cooperate on major armaments programmes. The second chapter focuses on the key challenges for European armaments cooperation. The third chapter contains a series of recommendations, based on the lessons learned from past cooperative programmes, to be applied to future cooperative programmes.

Why European governments collaborate

European armaments cooperation has often been very difficult. But the results of our interviews with project managers and defence officials across Europe show a broad consensus that, for procuring many types of defence equipment, there is no alternative to European cooperation. The cooperative programmes analysed in this study have had varying degrees of success. The good news is that over the last 20 years European cooperative programmes have slowly become better managed, and some of the lessons from earlier programmes are being applied to more recent programmes. But there is still much room for improvement, in particular in the management and execution of cooperative programmes. First, it is important to consider what the parameters for success are.

2.1 Parameters of success

In principle, the basic parameters of success for defence programmes should be to deliver a capability on time and to budget. However, as many national studies have shown, national defence procurement can be difficult, and national programmes are often delayed and run over budget.² It is hardly surprising, therefore, that cooperative programmes, which involve a number of countries, also often encounter similar difficulties to national programmes. Thus, it is probably more realistic to consider relative success rather than absolute success when analysing cooperative programmes. For example, the Franco-German-Spanish Tiger programme was a relative success, despite delays, due to its innovative use of a through-life approach, whereby countries cooperated on in-

service use as well as development and procurement. But the four-country Eurofighter project was less of a relative success in terms of its budget overruns and delays in delivery (although it has been a relative success in terms of its export ability). Part of the problem has been that European governments do not have common analytical tools to measure the success and failure of cooperative programmes.

In addition, the parameters of success differ according to the characteristics of the programme. Basically, the more advanced, innovative and sophisticated the technology, the higher the risk that there will be problems. For instance, the complexities of manned-aerospace programmes, and their ever-increasing costs, mean that there are a decreasing number of programmes – although this rule may not apply in the case of future unmanned aerial vehicles (UAVs), which are currently less complex than manned airplanes, and satellite programmes, which are often ‘dual-use’, meaning they have both military and civil uses. Thus, there are currently three fighter jet programmes in Europe (Eurofighter, *Rafale* and Gripen), plus the transatlantic programme, the Joint-Strike-Fighter (JSF). In contrast, multinational cooperation has been less needed for land systems because the technology has been relatively inexpensive; for instance there are 23 armoured fighting vehicle programmes across Europe.

Naval systems are becoming more complex, split between mature platforms (which can be built nationally) and advanced systems (which increasingly can only be acquired multi-nationally). Currently there are over 20 naval programmes across Europe. The shift from traditional platform acquisition (ships, tanks,

² For example, see the UK National Audit Office report, ‘Ministry of Defence, Major Projects Report 2006’, 24 November 2006, or the French Comité des Prix de Revient des Fabrications d’Armement, 25^{ème} rapport, Ministère de la Défense, Paris, avril 2003.

planes) to systems acquisition and integration (precision-guided munitions, communications) means that different programmes often require the same technology.

In sum, it is important to remember that all large and complex engineering projects are difficult to manage, and not only defence projects. Major civilian projects of similar complexity, such as the Airbus-built A380, Wembley Stadium in the UK and the toll system project for German motorways have all encountered delays and budget over-runs due to poor management and/or other difficulties. Seen in that light, and despite all difficulties, there is a positive trend towards increasing efficiency in European cooperative defence programmes.

2.2 The reasons why European governments collaborate

European governments collaborate on multinational equipment programmes for a number of reasons. Defence budgets across Europe are static, while the cost of equipment is rising, so it makes sense for governments to share the cost of developing and procuring defence capabilities. However, different European countries participate in collaborative programmes for different reasons, and some governments do not participate in any. This is because a number of factors go into the decision to participate in a collaborative programme, such as military cooperation with other countries, the need for a capability, cost (including potential savings), political benefits, and industrial benefits. The importance of these factors varies greatly from country to country, and while some governments have similar procurement interests, others have no interest because they cannot afford to participate and/or see no prospect of industrial participation. In those cases, non-participating governments generally prefer to buy their defence products ‘off-the-shelf’.

In general terms, those countries with a significant defence industry, ‘producer’ countries, are much more likely to participate in a cooperative programme than those countries which do not have significant defence industries – ‘con-

sumer’ countries. However, the growing use of new technologies by defence ministries, especially software, which are increasingly adapted from civil technology for military use (known as ‘dual-use’ technologies), means that there are likely to be more opportunities for ‘consumer’ countries to participate in future cooperative programmes. The trend towards network-centric warfare creates many new opportunities for countries with sophisticated civil technology industries, i.e. software and electronics, to participate in ongoing and future programmes. In addition, further opportunities for ‘consumer countries’ are created by the increasing adoption by defence ministries of the ‘through-life’ approach to multinational programmes, cooperating on maintenance, training, logistics as well as development and procurement. The EDA’s ‘Cooperative Mechanism’ should help to identify the full range of opportunities for the EDA’s 26 participating Member States (pMS).

Successful cooperative programmes have manifold benefits:

- ▶ Meeting a capability requirement at an affordable price. Collaborative programmes allow greater economies of scale because of the larger order books. These savings also allow European governments to contemplate acquiring more advanced equipment (and share development costs), despite static defence budgets. For instance, while the French national *Rafale* programme was less expensive than the four-country Eurofighter in development costs, the price of the Eurofighter per unit is cheaper than the *Rafale*.
- ▶ Common equipment can help countries work together on international missions. Most EU Member States will only carry out military operations as part of a multinational coalition, and such ‘interoperability’ is vital for the success of military coalitions.
- ▶ Governments gain political benefits, and are perceived to be a constructive EU partner, and contributor to EU defence. This is important since the EU’s role in international security is growing. Moreover, multinational procurement encourages greater convergence of

thinking about international security among EU governments, which helps foster a common European strategic culture.

- ▶ Cooperative programmes help to maintain the European defence industrial and technology base, and can help ensure security of supply. Defence industrial strength and policies differ from country to country. National defence industrial autonomy used to be the main goal of European governments' defence industrial policy, but it is no longer sustainable on a national basis because of static defence budgets and rising equipment costs. However, the idea of European defence industrial autonomy is unrealistic for the time being since large parts of the European defence industry remain fragmented, while other parts of the industry are increasingly 'globalising' their supply chains. The benefit for industry can be to develop competitive products, such as Eurocopter.
- ▶ Positive side effects such as technology sharing, technology development, common standards, integrated logistics and successful exports. For instance, the six-country nEUROn unmanned-combat-aerial-vehicle (UCAV) prototype programme is a good example of shared technology development. In addition, a cooperative programme can have more chance of being exported to non-EU countries than a national programme, because it typically has more sophisticated technology – usually at a competitive price

due to large order books from participating countries – and collective lobbying. The multinational Eurofighter, for example, has had more export success than the French national *Rafale* fighter jet. But cooperative programmes do not always guarantee export success, and general export difficulties remain, sometimes because participating countries cannot agree on common export policies.

All the advantages of cooperative programmes depend on how well or poorly they are managed and the use (or not) of best practice. A poorly-run multinational programme can have worse results than a poorly-run national programme – because of its size it can have greater delays and budget-overruns than national programmes. In the same way that success can be manifold through a cooperative programme, so can the problems when things go wrong. For instance, the Trigat MP programme is a good example of how a cooperative programme should not be run, as the five participating governments signed six separate Memorandums of Understanding (MoUs), resulting in 114 months of delays, and in the end the programme was cancelled. In contrast, the Franco-British-Italian Aster family of surface-to-air anti-missile missiles show the benefits of cooperative programmes when they are well managed: although there were some delays these programmes have delivered top-of-the-range capabilities.

Challenges for European armaments cooperation

There are many challenges for European armaments cooperation. This section looks at seven of these challenges:

- strategy, doctrine and capabilities;
- budgets, programmes and co-ordinating demand;
- common requirements and the scope of multinational programmes;
- differences in national procurement processes;
- multilateral project management;
- government-industry relations;
- research and technology.

3.1 Strategy, doctrine and capabilities

There is a real need for Europeans to think more creatively about what kind of defence capability they want. What sorts of missions do they envisage undertaking – and how do they expect their forces to operate in future? Europeans governments need to make a searching assessment of the kinds of additional tasks they want their armies to perform, alongside traditional peace-keeping. The European Security Strategy (ESS), prepared by the EU High Representative, Javier Solana, provides a good basis for thinking about future EU missions.³ The ESS outlines five key threats to European security: terrorism; proliferation of WMD; regional conflicts; state failure; and organised crime. The ESS points out that none of these challenges are purely military; nor can they be addressed by purely military means. But there is a real need for Europeans to

think more creatively about what kind of defence capability they want. Since its first military operation in 2003, the EU has completed and/or is undertaking eighteen ESDP missions (not all are military operations). This trend suggests that the EU will undertake more military operations in the future.

While EU Member States have a security strategy, and are undertaking more operations together, a lack of common doctrine does hinder the development of common requirements, which in turn can slow down the progress of cooperative programmes. It is true that EU governments have very different military strengths, and diverse attitudes towards the use of military force. However, an increasing number of EU missions each year are likely to encourage EU defence ministries to develop some shared ideas on military doctrine. A type of ‘partial doctrine’ will likely develop on an *ad hoc* and case-by-case basis between the national defence ministries, rather than directed through the EU institutions in Brussels – although the EU Military Staff is helping the Member States to develop some ideas on shared doctrine for ESDP missions through its ‘ESDP concepts’, such as its ‘Rapid Response Air Initiative’ and its studies on the future role of maritime forces in ESDP operations.

Obviously, European countries have very disparate military traditions, and they have great difficulties finding money for new defence equipment. According to the European Defence Agency (EDA), twenty-five EU governments collectively spent approximately €193 billion on defence in 2005,⁴ which means that, collectively,

³ European European Council, ‘A secure Europe in a better world – European Security Strategy’, Brussels, 12 December 2003. Available online at: <http://www.iss.europa.eu/solana/solanae.html>.

⁴ European Defence Agency, ‘European Defence Expenditure in 2005’, Brussels, November 2006. Available online at: eda.europa.eu/WebUtils/downloadfile.aspx?fileid=220.

the EU governments are the world's second biggest defence spenders after the US. That amount of money should be enough to cover Europe's defence needs. But despite these hefty financial resources, Europeans do not have nearly enough useful military equipment because they spend their defence money very poorly.

The Europeans spend approximately half what the US spends on defence, but they have nowhere near half of the US capability because too much of European defence money is wasted on duplication of programmes, as well as conscript troops and outdated equipment which are useless for foreign missions. For example, the US has over 200 long-range transport planes that can carry the heaviest loads. The Europeans, in contrast, have only established interim solutions – the UK is currently leasing four C17s from the US, while 15 European countries have signed up to the Strategic Airlift Interim Solution (SALIS) to lease two Ukrainian Antonov A-124-100 based in Leipzig and four planes based in Ukraine. Even allowing for the fact that Europeans do not have nearly so many global commitments as the US, that ratio is unacceptably low. No European country can afford to buy or develop every conceivable category of weaponry. Governments, therefore, often have to combine their resources to develop and procure major new capabilities.

Lessons from missions and the shift from platforms to capabilities

The definition of required capabilities has been one of the main topics that have driven military and political discussions within both the EU and NATO in recent years. Spurred by their experiences in the first Gulf War in 1991 and in the Balkans later in the 1990s, European countries have shifted their military force planning from conventional territorial defence to expeditionary missions. However, with the exception of the British and French armed forces, who have conducted national expeditionary missions in recent years, nearly all other European armed forces have lacked the essential capabilities

to carry out expeditionary operations. As most EU countries only envisage participating in military operations as part of an international coalition, it is in their interest to develop shared ideas on capabilities.

Capability categories

Capability categories differ from country to country. Also not every country wants to invest in every category (i.e. strategic transport). Plus different countries have different timelines for capabilities and their capability planning. The UK and France think 30 years ahead for their R&T planning, while Italy's so-called 'strategic vision' looks 15 years ahead. Generally we can identify six categories (they are also mirrored in the Headline Goal 2010 and in NATO's Prague Capabilities Commitments):

- mobility and deployability;
- sustainability;
- engagement;
- strategic transport;
- command, control and communications;
- intelligence and surveillance.

However, despite a common recognition of required capabilities, national specifications for requirements can hamper cooperative programmes. For example, although the UK and France have discussed cooperating on procuring aircraft carriers, there remain differences in national specifications which could hinder their interoperability.

Capability processes

European governments have already signed up to several initiatives to improve their military capabilities in NATO and the EU contexts, according to what is in essence a European model of military 'transformation'.

EU initiatives to improve defence capabilities include:

- Helsinki Headline Goal: established in 1999.
- European Capabilities Action Plan (ECAP): this was established in 2001 with

19 capability groups, but has made relatively slow progress.

- **Headline Goal 2010:** established in 2003.
- **European Defence Agency (EDA):** established in 2004. It has taken over eleven ECAP groups, and the 'Capability Development Mechanism', which was established in 2003 to assist the ECAP process.

NATO initiatives include:

- **Defence Capabilities Initiative (DCI):** established in 1999 at the NATO summit in Washington, D.C. It consisted of 58 categories but had little real success.
- **Prague Capabilities Commitment (PCC):** established in 2002 at the NATO summit in Prague as a follow-up to DCI. It focuses on four main areas.

However, none of these initiatives have yet led to major increases in new military hardware, mainly due to the slow pace of procurement investments.

3.2 *Budgets, programmes and co-ordinating demand*

In general, defence budget comparisons are difficult in Europe, because the collection of national data follow different national standards. For example, in France the cost of paramilitary constabulary forces (the *Gendarmerie*) forms part of the data in the defence budget, in other countries the cost of comparable forces does not appear in the defence budget data. Furthermore, the UK and France maintain an expensive nuclear force while the other European states do not, which can complicate the comparison of defence expenditure trends.

Specific to cooperative programmes, another basic problem is the lack of coordination of investments. For instance, on the FREMM programme, France paid on behalf of Italy for 6 months, between November 2005 and April 2006, because Italy could not find the

money during that period. Likewise, during the transatlantic MEADS programme, the US paid for Germany between September 2004 and March 2005. Thus, not only is it difficult to compare national data on defence budgets, but governments also have difficulty coordinating their investments in cooperative programmes.

Trends in defence budgets

At present, the 27 states of the European Union devote approximately €193 billion to defence. The five biggest spenders are the UK, France, Germany, Italy and Spain. If one compares defence expenditure as a percentage of gross domestic product (GDP) huge differences occur: France and the UK invested heavily in 2004, Germany and Spain did not, while Italy is somewhere in between – for example, according to the International Institute for Strategic Studies, France spent 2.6% of its GDP on defence in 2004, and the UK invested 2.3%, in contrast with Germany (1.4%), Italy (2.0%) and Spain (1.3%).⁵ This general trend with France and the UK on one side and the rest of the main European armaments states on the other stretches back about 15 years.

These divergent budgets reflect different strategic orientations about the use of armed forces. These differences in strategic orientation explain the capability shortfalls of many European armed forces, because Europe does not define itself as a global power that needs corresponding military means. Instead, national governments define their own needs on a national basis. France and the UK differentiate themselves from the other European states, because they have a similar approach to the use of force and are prepared to command national expeditionary operations. Nevertheless, most EU Member States are participating in international coalitions (whether the EU, NATO or the UN), and have signed up to the EU's general capability plans (i.e. Headline Goal 2010).

The problem is not how much the EU Member States spend on defence, some €193 billion,

⁵ International Institute for Strategic Studies, *The Military Balance 2006* (London: Routledge-IISS, 2006).

which is a significant amount of money. The issue is the capability that the EU governments can deliver with that amount of money. The EU-27 governments have close to two million personnel in their armed forces, but they can barely deploy 100,000 soldiers around the globe. This amounts to 5% of EU armed forces, a ratio that is ten times worse than the US, which can deploy half of its armed forces. Presently, EU governments are close to overstretch – the EDA pMS had 74,000 soldiers deployed on operations in 2005, which amounts to 4% of their armed forces.⁶ This European lack of military muscle is partly due to a shortage of professional soldiers (there are still close to 400,000 conscripts in the EU), but also because most EU governments lack the equipment to carry out these missions adequately, such as transport planes, precision-guided-munitions and communications equipment.

European defence programmes

National, rather than European, priorities are reflected not only in budgets, but also in procurement programmes. In 2005, the EU Member States spent approximately €26 billion on investments in procurement. 82% of this money is invested in national programmes. The result of this national fragmentation is a duplication of development and production and different standards of equipment. This fragmentation also aggravates common logistic support systems and diminishes military interoperability.

Another problem is the lack of economies of scale, with too many small procurement programmes for essentially the same capability. The following table compares US and European procurement programmes and demonstrates Europe’s huge inefficiencies – some 89 programmes on much lower defence procurement budgets:

Defence Programmes in Europe and the US

System	Europe	United States of America
Land Systems		
- Main battle tanks	4	1
- Armoured fight. vehicles	16	3
- 155 mm Howitzer	3	1
Air Systems		
- Fighter-strike	7	5
- Ground attack-trainer	6	1
- Attack helicopter	7	5
- Anti-ship-missiles	9	3
- Air-to-air-missiles	8	4
Sea Systems		
- Main surface combatant ships	11	2
- Diesel submarine	7	0
- Anti-submarine torpedo	9	2
- Nuclear-powered submarine	2	1
Total	89	27

Source: European Commission, UNISYS, Final report of the study: *Evaluation of the Common Initiative in the context of the Intra-EU Transfers of Defence Goods*, Brussels, February 2005.

⁶ See European Defence Agency, op. cit. in note 4.

One prominent example of this redundant spending in large systems is in the field of Main Battle Tanks (MBT): while Germany produces the internationally successful Leopard-2 family, France (Leclerc), Italy (Ariete) and the UK (Challenger) procure their own systems, thereby wasting money on duplicating R&T and limiting interoperability.

Another striking example is combat aircrafts. Despite heavy competition from the US, Europe has developed three parallel types, namely the Swedish Gripen, the French *Rafale* and the German-British-Italian-Spanish-built Eurofighter. A global market of approximately 3,000 units is predicted for the new US Combat Aircraft, the Joint-Strike-Fighter (JSF), but the order book for the European types is much lower: Gripen (204), *Rafale* (294) and Eurofighter (620). Furthermore, the collective R&D costs of the three European airplanes are comparable to the more advanced JSF: Eurofighter cost €19.48 billion, Gripen €1.84 billion and *Rafale* €8.61 billion – the cumulated R&D costs of the three European combat aircraft was €29.93 billion, with 1,118 units in final production. R&D for the JSF is estimated at €31 billion and the market forecast is for production of 3,000 units.

Co-ordinating the demand side

The number of different programmes in Europe shows that European governments do not yet co-ordinate much of their demand for defence products, despite their shared capability goals. The task for European governments in the future is to coordinate more of their demand and to spend their defence budgets more efficiently, if they wish to acquire the full range of required capabilities. The challenge is that national procurement processes are already complex, and adding another country can complicate and slow down a joint project if it is to meet the needs of all the customers – in this case the governments. For example, governments often have different timelines for the delivery of

their capability. During the 1980s France and Germany discussed jointly developing a new tank together. However, Germany wanted the tank as soon as possible, whereas France was planning for a decade later. Thus, the Germans pursued their own programme which became the Leopard-2 programme, and France developed its own Leclerc project. European defence ministries have discussed coordinating their demand for defence products for many decades, and a number of institutions and agreements have been created to support this process:

- European Headline Goal 2010 (EHG 2010): a list of military capability goals, that Member States aim to achieve by 2010.
- European Capabilities Action Plan (ECAP): identification of shortfalls, improvement of capabilities for European armed forces.
- Letter of Intent/Framework Agreement: effort to implement a common understanding of industrial restructuring between the most important armaments states about security of supply, security of information, research and technology, export regulations and harmonisation of military requirements.
- European Commission Green Paper: looking at ways to open up the European defence market and to curb national fragmentation and protectionism.
- European Defence Agency Code of Conduct: increase transparency, and therefore competition, in European defence procurement.

3.3 Common requirements and the scope of cooperative programmes

For many of the officials interviewed, clearly-defined shared requirements are a fundamental prerequisite for a successful cooperative programme. For others shared requirements are merely ‘missing the wood for the trees’, meaning two things:

1. The definition of a requirement can be a way to favour national industry. Governments sometimes define their requirements in a way that would allow their industries to play a larger role in the programme, thereby supporting their own national interests, or it can be a means to choose national sub-systems;
2. The definition of a requirement can be a way to avoid participating in a cooperative programme if a country has already decided to have a national programme instead.

Because requirements can be easily manipulated, the language used to define common requirements has a great impact on the success or failure of a cooperative programme.

Operational and technical requirements

Governments should mainly define their requirements in operational terms rather than in technical terms. The lessons from past programmes show that when requirements are defined in technical terms it is more difficult to reconcile the demands of participating governments.

- The choice of certain technologies can potentially favour one country's industry over another;
- The logic of the capability process is to define an operational capability (i.e. destroy a certain number of targets in a certain amount of time) and not to define precisely how you attain this result. So focusing on technical aspects is not the best way to define a precise requirement;
- Highly technical definitions of requirements tend to take longer to agree and make the process more complex, which makes compromise between governments more difficult.

For instance, the problem of using highly technical specifications became evident during the Horizon frigate programme during the

1990s. The choice of radar systems caused a rift between the United Kingdom and France and Italy. Italy and France chose to purchase the Empar radar provided by Thales and Alenia and the United Kingdom purchased the Sampson radar provided by BAE systems.

Diverse requirements

It would be easy to compromise if each country expressed their needs and the cooperative programme was able to meet each specification. However, the diversity of demands would create a 'lamb with five legs', to quote one official: the resulting system would be very expensive and complex and would effectively be counter-productive to the idea behind a cooperative initiative. A perfect example of this is the Tiger Helicopter Programme, launched during the 1980s. In the end, two different helicopters had to be produced, one to meet the requirements of France and one to meet the requirements of Germany. Likewise one reason France left the Eurofighter programme was because it wanted a multi-role fighter, whereas the UK wanted a ground attack jet, and Italy preferred an interception jet. France, therefore, pursued its own national *Rafale* programme instead. Similarly, one reason the UK left the Horizon frigate project in 1999, was because it could not agree on shared requirements with France and Italy, and decided to pursue its own programme, the Type 45 (although it has continued with a collaborative naval missile project with France and Italy known as PAAMs, which will be used on both the Franco-Italian and British ships).

The first step to a successful cooperative programme is to carefully determine which specifications are common to all parties and which specifications must be left to the responsibility of individual Member States. However, there are three prerequisites:

- A strong integrated multinational team which is able to combine and synthesise national requirements into a cohesive and common objective;
- An understanding that beginning the

process of negotiations will require an extensive period of time, and that open communication is fundamental in order to avoid misunderstandings between partners;

- Clear expression of each country's essential requirements and a willingness to forego unnecessary demands in a spirit of cooperation. Plus the more governments define their requirements in operational terms the better.

In-service support

A programme does not end once equipment is delivered and put into service. The duration of a programme continues until the end of the equipment's useful life cycle (including its disposal). The cost of in-service life support can amount to over twice the acquisition cost of a programme. For example, a study from the French *Comité des Prix de Revient des Fabrications d'Armement* shows that the cost of the French aircraft carrier Charles de Gaulle was €3.1 billion to render into service, but cost €7.7 billion over the period of its useful life.⁷

Defence equipment evolves over its life cycle. Without collaboration and cooperation over the course of this evolution, the interoperability of armaments becomes impossible. This was the case with the Transall cooperative programme during the 1960s. The Transall was a joint effort of France and Germany, but once the Transall was put into service cooperation ended. It is now impossible to exchange a French with a German Transall because the spare parts are no longer the same and the operational function of each has evolved in different ways.

Most of the governments of the EDA pMS have vocally supported the extension of support to the end of the in-service life, yet in practice two realities make this difficult:

- Governments tend to choose national solutions to provide support for the in-service life of a cooperative programme. It is a way to give work to the national industrial base, to maintain employment and so

on. More and more support services have been sub-contracted to private industry even if it is necessary to involve military staff as well;

- In theory, support services require a long-term contract, as the life of a piece of equipment could be as long as 30 or even 40 years. But some countries are not able, for economic or legal reasons, to uphold such long-term contracts. For example, France is only able to propose a support contract for the A400M covering a few years due to French financial rules.

Shared support of cooperative programmes throughout their life cycle, therefore, requires very strong political will on the part of governments. For the moment, this through-life service approach appears to be easier to organise for training but more difficult for logistics and support services. However, the record of shared in-service support is mixed. The governments participating in the Tiger programme have recently signed an MoU to establish a common structure for in-service support. But the governments involved in the A400M have made less progress, and seem to be heading for primarily national in-service support.

3.4 Differences in national procurement processes

National procurement processes in Europe diverge greatly. Several countries have used Article 296 of the Treaty on European Union (TEU) to justify their protectionist policies within their procurement processes. The first problem is a lack of transparency within national procurement processes. Article 296 permits states to restrict their defence equipment tenders to national providers and allows governments to favour national 'champions' in order to promote their own technological and industrial development. Moreover, procurement agencies are required to explain their choices to national parliaments who sometimes apply pressure to favour national industry.

⁷ Comité des Prix de Revient des Fabrications d'Armement, 25^{ème} rapport, Ministère de la Défense, Paris, avril 2003.

The first step to improve the transparency of national procurement processes is the EDA's Code of Conduct on Defence Procurement (launched in 2006). The Code of Conduct was conceived with the intention of having greater transparency on national procurement procedures. If successfully implemented, it will greatly contribute to the creation of a more open European defence equipment market. Competition within the European market should improve and create pressure for lower prices and more efficient spending of defence budgets. The flatness of European defence budgets, combined with the fragmentation of national procurement processes, has favoured protectionism and greatly reduced the efficiency of defence procurement spending.

An additional problem is that tender procedures are structured differently in each country. Usually the difference is such that foreign companies must use local agents to formalise their bids. The different phases of a programme (pre-definition, design, development, production) can also differ in each country.

Another factor which has sometimes greatly complicated cooperative programmes is different parliamentary approval processes for programme budgets. Each Member State has its own parliamentary procedures, and they are impossible to coordinate given the national politics involved in such decisions. For instance, the parliamentary approval process for the A400M programme in Germany took two years. Since Germany had the largest slice of the order book for the A400M (60 planes) the other partners had no choice but to wait until 2003 when the German parliament had finally approved the German budget contribution.

3.5 *Multilateral project management*

All past cooperative programmes show that there is a strong correlation between the level of integration within project teams (both on the customer side as well as on the supplier side) and the success of cooperative programmes. However, it is not an instinctive impulse for national

defence ministries to act in such an integrated way, because the more project management is integrated, the less likely ministries will be able to exert full control of a cooperative programme.

All the lessons learned from the cooperative programmes during the 1980s show that the questions that governments could not reach agreement on during an MoU negotiation were discussed by the multinational project team. But these multinational project teams had no decision-making powers. Each national representative in multinational project teams always had to ask their governments what position they should take when the project team did not agree on a question, even if it was a minor issue.

For example, during the Trigat MP programme (ultimately cancelled in 2000) there was a problem with the security lock which blocked during testing. In the programme office national representatives were not able to reach agreement on a solution. The question was then referred to the national procurement administrations. France wanted a 10,000 bump test and the UK wanted a new security lock with a 5 micron-thick Teflon component. In the end, they were unable to agree, so they decided to add both solutions, the 10,000 test and 5-micron-thick Teflon component. Reaching this decision took up a lot of time with the added cost of two solutions rather than one.

For cooperative programmes initiated in the 1990s, the lesson was to use a permanent integrated project team (IPT). The first IPT was an *ad hoc* team within the Horizon Joint Project Office (HJPO) created in 1992, for the Horizon frigate project and based in London. In the Horizon project office the officials involved did not simply represent their national governments but worked in a truly integrated team. They had the power to manage the programme and to conclude contracts and used British procurement methods since the project team was located in London. Over time, however, the HJPO had less and less power as disagreement between the partner defence ministries arose. However, it was the HJPO structure that governments used as a role model when OCCAR (Organisation conjointe de Coopération en matière d'arme-

ment) was created in 1996, and OCCAR now manages the Franco-British-Italian PAAMs missile programme that will be used on Horizon ships.

Changing procurement practices

The practice of defence procurement has evolved over the last decade. First there is the tendency to have fewer phases (usually only three) in a programme. The first phase now consists of the predefinition phase, the second phase encompasses development/design, during which technological risks are evaluated, and which currently lasts longer than in past programmes. The third phase is the production phase. In more complex programmes (NATO AGS, MEADS) sometimes there is a fourth phase between the definition and development phase, essentially the risk reduction phase (for simulations and pre-tests). The UK introduced this practice in its so-called 'Smart Procurement' reforms in 1998, and France later adopted the same methodology, while Germany has been following the same concept in principle since 2001.

For cooperative programmes it is a better approach to reduce the number of phases. In the past governments had to negotiate a different contractual document for each phase of the programme, causing major delays since each government had to approve the contract. During the Trigat MP programme, no less than six MoUs covering six phases were signed for the programme, requiring all five participating governments to approve each MoU, thereby delaying the programme by approximately five and a half years.

The second tendency is to have a clearer understanding of allocating responsibilities between the customer and the provider. The more the predefinition and design phases have been well organised the easier it is to define clear allocation of responsibility between customer and supplier. This sharing of responsibility has a clear objective: to define as precisely as possible the cost of a programme and the timescale of delivery. Since most of the risk should be reduced during the predefinition phase, it should be easier to delegate more risk to indus-

try for budget or timeline overruns, known as the 'commercial approach' to programme management.

The approach the governments choose also depends on the complexity of the system they wish to procure. For more complex systems, like the Future Aircraft Carrier, the UK has introduced a new system with both industry and the defence ministry taking part in the decision process, and the MoD participates actively in the industrial consortium. The idea is to share risk between the defence ministry and the industry – in the aircraft carrier example the companies are Thales, BAE Systems and Kellogg Brand Root. Thus, the risk is shared between customer and supplier. That means there is no strict fixed cost and the defence ministry pays the market price to get involved with the defence company's work at any time during the programme.

For less complex systems it is the opposite model. It is possible to have one contract from the beginning where the government defines a fixed cost and the number of items demanded, plus the unit price and the time of delivery for all the items. If these conditions are not satisfied, industry takes on all risk. Industry has to determine its risks and include those in its financial propositions to defence ministries. If industry under-evaluates the risk, it will be charged extra costs: this is the principle behind the commercial approach used for the A400M.

3.6 Government-industry relations

Static defence budgets and low equipment-spending means that a competitive defence industry is not sustainable on a national basis anymore. In the past decade, some sectors of the European defence industrial base have consolidated across borders. This is particularly true for the aerospace and defence electronics business. However, the process is far from having reached an optimal situation – even in those sectors where it is more advanced – and further consolidation is desirable. The industry must consolidate further if Europe wants to play a significant role in the global defence industry, able

to cooperate and compete as an equal player. Moreover, certain areas of defence production have been almost completely excluded from the consolidation process; this is particularly true for naval platforms and land armaments in general, where most of the European industrial base is still structured around small- and medium-sized national champions (exceptions are the subsidiaries of General Dynamics, such as Santa Barbara Sistemas, MOWAG and Steyr Spezialfahrzeuge). In addition, cooperative programmes do not automatically lead towards further industrial consolidation. For instance the PANAVIA consortium that built the Tornado aircraft did not lead to consolidation between the participating defence companies.

Differences in government-industry relationships

Different national defence industrial policies make it difficult to develop common procurement approaches. A government's attitude towards a programme is sometimes linked with the 'special relationship' it has with its 'national' industry – the depth of connection between the military and the industrial players varies enormously from country to country and sector to sector. This explains why different governments have different attitudes, and sometimes take a more or less nationalistic posture when deciding if and how to enter a cooperative programme. Generally speaking, the lower the interconnection between the military and the industry, the more competitive the defence market. Across Europe, there are essentially four different attitudes to government-industry relations:

1. Countries which pursue a special relationship with national champions including ownership (i.e. Italy and France).
2. Countries which have a strong national presence in the defence industry, but where the government is more open to competition and not a shareholder, but wants to preserve employment and desires ownership of technology rather than industry (the UK and Germany did

favour this approach but now seem to be moving towards the approach favoured by Italy and France).

3. Countries which have niche capabilities and pursue a policy of protecting those capabilities, and even though they need to cooperate with other governments they try to preserve their niche capabilities (Spain, Czech Republic).
4. Countries which have few or no defence industrial capabilities, and therefore focus on off-the-shelf purchases. Sometimes they have dual-use capabilities that can be integrated into cooperative programmes (Estonia).

Redundant industrial skills

Slow progress in cross-border industrial consolidation also means that there are numerous redundant industrial skills across Europe. Some governments waste scarce procurement and development money on sustaining certain defence technologies nationally, which are usually too small or unsophisticated to be internationally competitive – thereby aggravating the problem of over-capacity.

Schematically, two paths towards technological and industrial consolidation are possible. The first one is government-led, as the government takes charge of identifying strongholds and weaknesses of the different producers and selects the best ones, cutting funds to the others. The second is business-led, as the different companies are allowed by governments to act freely and select partners and competitors, thus market forces select the best producers.

The danger is that further consolidation leads to less competition, thus there is a real need for governments to strike a balance between consolidation and competition. Further defence industrial consolidation also needs to guarantee that small but good technology providers can survive in a market in which the players tend to become bigger and bigger. In other words, in a very similar way to how the European Commission polices the single market for non-defence goods to prevent monopolies of technology, one key question for the

defence market in Europe is how to ensure that a variety of niche capability companies survive moves towards greater consolidation.

Juste retour

Work-share arrangements, known as *juste retour*, guarantee that a national defence industry must receive work worth the full amount of its government's financial contribution to a programme. Experience shows that the more governments and industrial interests involved, the more difficult the cooperation. *Juste retour* is possibly the single biggest obstacle to smoother cooperation on joint European programmes, but it would be difficult for governments to scrap *juste retour* arrangements in the short term – although the OCCAR 'global balance' system is an improvement on previous arrangements.

But EU governments cannot afford *juste retour* on limited defence budgets, plus Europe's defence industry is increasingly cross-border. There is little that is just about *juste retour*, since it distorts competition and causes duplication of technologies. Ideally governments should simply scrap *juste retour* arrangements – this would encourage much greater industrial consolidation and technology specialisation across Europe, and focus procurement on choosing the best company with the best product for the right price. But this is politically unrealistic, partly for industrial policy reasons, but also because governments have kept *juste retour* to ensure the security of their defence equipment supply.

Governments used to decide their *juste retour* arrangements on an *ad hoc* programme-by-programme basis, for example in the Horizon and Eurofighter projects. In the Trigat MP programme, the manufacture of one part of the missile – the junction case/interface box, which cost roughly €1,500 to make – had to be split between four out of the five participating countries because of *juste retour* arrangements. Today, most of the main producer countries in the EU use a systematic approach to *juste retour*, namely the OCCAR 'global balance' system. In principle, this is a

welcome modification of the traditional *juste retour* principle, which greatly hampered European cooperation in the past.

Under present OCCAR rules, the defence industry of a Member State must receive work worth at least 66 percent of its government's financial contribution to programmes calculated over a number of years (the so-called 'global balance' arrangement). In theory, this is progress compared with traditional *juste retour* practice, under which a national industry received work equivalent to the full amount of its government's financial contribution. The problem is that there are no concrete examples of how the OCCAR system works in practice, as not enough programmes have been agreed based on OCCAR rules. In addition, the OCCAR system appears to mainly benefit the larger producer countries – since they can participate in more programmes and their large defence industries can win significant contracts – with few incentives for smaller niche capability or consumer countries. In essence, there are two reasons why governments want to keep some form of *juste retour* for cooperative programmes: employment and control of technology.

Intellectual property rights

Intellectual property rights (IPR) often complicate cooperative programmes, because it is not always clear who owns the defence technology IPR. When it comes to IPR, defence companies and governments do not always share the same interests, plus there are differences between those countries which have significant defence industries and those which do not. The problem is that, unlike for civil technology, there is no Europe-wide equivalent of the European Patent Office for defence IPR, covering both attribution and transfer of IPR, which would help foster a common market for defence technology ideas and innovation. This is because such rules would simultaneously have to take into account three aspects:

1. The governments' need to control the spread of technology and guarantee security of supply;

2. The incentives for prime contractors to innovate and adapt different technologies;
3. The imperative for sub-contractors to protect their niche capabilities.

Another factor is that, depending on the programme, different distributions of IPR occur. The more strategic and sophisticated the technology, the more governments want to pay for it and control it, but the more mature the technology, the more industry controls the IPR. For instance, on the German-Italian-US MEADS programme, the defence ministries own the IPR. For the nEUROn programme, each company keeps their IPR even if each of them has full use of the prototype. For example, the French DGA and Dassault have no access to the Italian firm Alenia's know-how on the internal bay of the UCAV. Alenia should only share information with the other partners when it is necessary for the coherence of the whole programme.

In addition, IPR issues can adversely affect exports, as non-EU governments may not buy the product if the IPR restrictions are too strict. Plus sometimes different EU governments have different ideas on how restrictive they should be with IPR, and while one country may sell a defence product to a non-EU country, another EU country may not sell the same product for IPR reasons.

It is a difficult endeavour to strike the right balance between all these different concerns. IPR provisions are usually agreed in the MoUs and then cascaded into the contract. The problem is that they are agreed on an *ad hoc* programme-by-programme basis, with no set model or systematic approach. This can waste time, as negotiating several MoUs means *ad hoc* negotiations on IPR each time. In addition, the MoUs for defence IPR are not publicly available, although officials interviewed for the purposes of this report stressed the difficulties involved with defence IPR. The definition of some common guidelines would represent a

big step forward towards the consolidation of a common market and further cooperative programmes.

3.7 Research and Technology

EU governments spend roughly €35.4 billion each year on procurement, research and development, of which about €9 billion is spent on defence R&D.⁸ France and the UK alone account for about 75 percent of that figure. Add in Germany and Sweden, and those four account for close to 90 percent of EU military R&D. More significantly, France and the UK each spend roughly 13 percent of their defence budgets on R&D, which compares well with the US (15 percent). The EU average, however, is only seven percent. In fact – aside from the UK and France – only six of the remaining EU governments (the Czech Republic, Germany, Italy, Poland, Spain and Sweden) spend over two percent of their entire defence budgets on R&D.

In a similar way as happens with European procurement spending, duplication and negative economies of scale reduce the effectiveness of this limited amount of money. For instance, for the MILAN-HOT missile project, France and Germany carried out two separate national research projects for the same technology and shared the results afterwards, rather than pool their resources. Given their limited research budgets, and potential economies of scale, governments should cooperate more on joint research projects. Moreover, closer European cooperation on military research can only help strengthen procurement co-operation, because successful research programmes are more likely to lead to successful procurement programmes. The Brussels-based Western European Armaments Organisation (WEAO), which was linked to the Western European Armaments Group (WEAG), had 19 Member States, and tried to promote cross-border R&T projects. However, WEAO did not make much impact on cross-

⁸ European Defence Agency, 'European Defence Expenditure in 2005', Brussels, November 2006. Available online at: eda.europa.eu/WebUtils/downloadfile.aspx?fileid=220.

border research cooperation, mainly because governments gave very little funding to WEAO cross-border programmes. Its projects received less than one percent of the total spent each year on defence R&T in the EU (partly because the governments had difficulties agreeing on IPR arrangements).

There are sound industrial and military reasons why governments should try to improve Europe's defence research performance. If the Europeans continue to invest too little in R&T, Europe will not be able to sustain a competitive and indigenous defence industry in the long term. Europe is already having difficulties sustaining its fighter jet industry in the face of competition from more advanced American products like the Joint-Strike-Fighter. The three fighter jets currently produced in Europe (Eurofighter, *Rafale*, Gripen) are all effective aircraft but their technologies are ageing, compared with the latest developments in the US. In the near term, the Europeans lack the resources to develop a European competitor to the JSF.

And on present spending trends, the same will hold true for future defence systems, such as sophisticated Unmanned-Combat-Aerial-Vehicles (UCAV).

The second reason for EU governments to cooperate more closely on R&T is a military one. A good way to ensure that armies can work effectively together on the ground is for national defence ministries to ensure that their equipment is compatible to help their interoperability. This does not mean European defence ministries all have to buy the exact same products made by one company. But it does mean that, for example, soldiers with different communications systems should be able to talk to each other. During the NATO stabilisation mission that followed the 1999 Kosovo war, American soldiers had secure communications equipment, but many of their European counterparts did not. Some European soldiers had to use ordinary mobile phones to talk to each other, which could be easily intercepted by the enemy.

Cooperative lessons learned

The recommendations in this section are based on the lessons learned from past cooperative programmes, and are broken down into five sections: programme requirements; research and technology (R&T); industrial cooperation; programme budgets; and project management.

4.1 Requirements

Establish a common requirements process

EU governments have agreed on a number of capability goals (Helsinki Headline Goal and the Headline Goal 2010) and established a 'Capability Development Mechanism'. A more comprehensive capabilities development process is necessary where governments discuss their common requirements process to complement these initiatives. Governments can draw on the common requirements methodology already used by the six governments that signed the Letter of Intent (LoI) – known as the Harmonisation of Military Requirements process (HMR). The advantages of using the HMR process are:

- Countries come together to discuss common staff targets.
- Countries do this by exchanging information on their military planning (capability, timelines, national specifications on the discussed programme).
- This could potentially lead to a decision on common staff requirements.

Provided all the pMS agreed, the EDA should organise this intergovernmental exchange on shared requirements, linking it to the 'Capability Development Mechanism' and working closely with the EU Military Committee and NATO.

Promote convergence of elements of pMS military doctrine

A common military doctrine would be the most efficient way to achieve common requirements, but this seems unlikely for the foreseeable future. However, as the EU is carrying out more operations each year, over time governments are likely to agree on some elements of a European military doctrine in line with the Petersberg Tasks, drawing on the 'ESDP concepts' work carried out by the EU Military Committee and the EU Military Staff. This in turn will help governments to agree on shared requirements and therefore enhance cooperative programmes. To help this process, 'lessons learned' studies should be undertaken to assess the experiences of completed EU missions (i.e. the EU operation in Bunia in Congo in 2003).

Involve industry from the beginning

Defence ministries' and military staffs should focus mainly on the functional/military requirements and largely encourage industrial players to propose different technical solutions (especially for more sophisticated systems). Industry should be involved in the requirements definition process from the beginning (involving industry early also matters for project management – see project management section on page 33). Not only can industry provide expertise on technical requirements, but they can also advise on delivery timelines. Plus industry can help develop shared requirements by proposing the same solutions (including 'off-the-shelf' solutions) for different national needs. However, it is important to have competition for the prototype/demonstrator phase of a programme – especially for complex 'hybrid' programmes – as governments have done for the JSF, Future Aircraft Carrier and NATO AGS programmes.

Apply a ‘through-life’ approach

Increasingly, governments plan cooperative programmes under a ‘through-life’ approach, including maintenance, training, logistics and operational use and disposal. This is necessary because the in-service cycle costs at least as much – and sometimes much more, depending on the programme – as the acquisition cost. ‘Through-life’ is also important to help ensure future interoperability on joint EU missions. For example, on the Eurofighter programme countries have tried to share some of the costs of simulators. A through-life approach can also offer an incentive for smaller countries to participate in a cooperative programme where *juste retour* applies, since they may be able to compete to supply aspects of in-life support, such as flight training, even if they cannot win any large industrial contracts. Finally, through-life also helps to build flexibility into a programme – since equipment regularly needs to be updated or modified – especially platforms that are often used for 30 or more years. Assessing these types of ‘modularity’ from the beginning of the development and procurement cycle to the end of in-life use helps to build flexibility into the programme.

4.2 Research and Technology

Exchange information on R&T planning

Closer European cooperation on defence research can only help strengthen procurement cooperation, because successful research programmes are likely to lead to successful procurement programmes. Governments need to exchange more information about their existing research projects and their future research plans to avoid duplication. The EDA should facilitate this information exchange and link it to the capabilities Headline Goal process and its efforts to map European industrial and technological capabilities. The quality of information exchange will depend in the case of some governments on their relationships with their industry. Establishing a European patent-style

system for defence IPR would also help to build confidence to share information (see project management section on page 33). Ultimately it should not matter whether cross-border defence research projects happen on the bilateral, multi-lateral or EU level, as long as intergovernmental coordination improves.

Establish an R&T ‘Headline Goal’

EU governments already have a Headline Goal of capability targets they are supposed to meet by 2010. They should develop a similar ‘Headline Goal’ for European defence research, a list of targets that governments should meet by 2020. This would provide much-needed guidance to industry and encourage more cross-border collaboration on joint research projects.

Boost European defence research programmes

There is only a limited number of countries who actually spend significant amounts of money on R&T. Given their limited research budgets, and the potential economies of scale, it is obviously in governments’ interests to cooperate more on joint research projects. Only 12.4% of the collective national R&T budgets of the EDA pMS is spent on multinational cooperative programmes. Three quarters of that 12.4% is spent on European projects, while the remainder is spent on cooperative R&T programmes with other non-European partners such as the US. The governments should boost their spending on bilateral and multilateral programmes to remain relevant in the field of security and defence in ten years time. In time, they should also encourage the EDA to initiate pilot projects on a broader range of technologies. The EDA should also work closely with the European Commission in particular on exchanging information, because some of the projects that will be funded by the Commission’s ‘security research’ budget (under the 7th Framework Programme) may have defence uses as well (‘dual-use’ technologies).

4.3 Industrial cooperation

Phase out *juste retour* within 10 years

Juste retour is the single biggest obstacle to smoother cooperation on joint European programmes, but it would be difficult for governments to scrap *juste retour* arrangements in the short term – even if the OCCAR ‘global balance’ system seems to be an improvement on previous arrangements. But EU governments cannot afford *juste retour* on limited defence budgets, plus Europe’s defence industry is increasingly cross-border. Governments should gradually phase out *juste retour* arrangements for future cooperative programmes within 10 years. This would encourage much greater industrial consolidation and technology specialisation across Europe, and focus procurement on choosing the best company with the best product for the right price. The competitiveness of the European Defence Technology and Industrial Base requires the phasing out of *juste retour* within ten years. This can be achieved by two different ways or a third way of combining elements of the first two:

- A government-led approach: a European Defence Industrial Policy will lead to more technology specialisation across Europe, including maintaining some niche capabilities in smaller countries (based on industrial and technological excellence criteria).
- A regulated market-driven approach: pMS agree to phase out all *juste retour* arrangements, starting from more mature technology and progressively expanding the Non-Juste-Retour (NJR) area to more sophisticated technology; this will generate incentives to select technology investment according to technology strength.
- A combination of the two strategies is the most likely strategy and also the most recommendable as it draws on market forces, but also takes into account governments’ concerns about protecting sensitive areas.

Governments can continue to pursue their own industrial and R&T policy as ‘phasing out’

does not apply to national policy, but only applies to cooperative programmes. Plus many of the officials we interviewed said they did not see any large cooperative programmes on the horizon for the foreseeable future, of the size of Eurofighter for example. But the point of phasing out *juste retour* is to prevent duplication. For instance, Spain used *juste retour* to justify duplicating carbon-fibre-reinforced-plastic (known as CFK) manufacturing on its soil for all Airbus programmes, including the A400M programme, as they perceive this to be a key technology. The desirable end-game should be a limitation of redundancy, while at the same time guaranteeing for most sectors the presence of two alternative sources of capabilities in the long run, to avoid creating dangerous monopolies. The criteria for determining *juste retour* in the interim should be based on two factors: the size of the contract – i.e. it should only apply to very large programmes and not smaller ones like the Trigat MP – and technology. The more mature the technology, the more competition should prevail over security aspects; conversely, the more sophisticated and strategic the technology, the more *juste retour* is justifiable from a security perspective – the nEUROn prototype project is a good example of smart *juste retour* based on national skills.

Extend security of supply agreements

One reason governments have kept *juste retour* is to ensure the security of their defence equipment supply. Thus, before phasing out of *juste retour*, governments would rightly want assurances about their security of supply. The ‘Framework Arrangement for Security of Supply between Subscribing Member States in Circumstance of Operational Urgency’ proposed by the EDA is a step in the right direction. For peacetimes, the governments should agree to extend the other aspects of the existing LoI security-of-supply agreement (signed by six governments) to all the EDA participating Member States depending on the outcome of LoI countries’ current negotiations on the so-called contractual conditions. The reality is that

Europe needs a different legal framework which would guarantee both security of supply and a smoother cross-border transfer of defence goods.

Extend EDA procurement code of conduct to multinational programmes within ten years

Governments could encourage further industrial consolidation by extending the EDA's voluntary procurement code of conduct to future multinational programmes (they are currently exempt) within ten years. This would help increase the transparency of the tender procedure for multinational programmes and encourage more joint tenders and competition for contracts, which should help keep prices down.

4.4 Budgets

Exchange information on national budget approval procedures

The process of approving budgets for cooperative programmes differs greatly from country to country. In the past, a lack of information has often slowed down the decision-making process (e.g. A400M, FREMM). Harmonisation of budget procedures would be extremely difficult due to the sovereignty of national parliaments. Governments could help overcome these procedural difficulties by increasing the amount of information they share with each other about their different approval processes. Before starting a programme, the governments should be clear about the different conditions for budget approval in the participating countries and should provide an agenda on the approval processes. In order to help co-ordinate national budgets for cooperative programmes, the EDA should facilitate an inter-governmental information exchange on different national procedures.

Use multi-annual programme budgets

Budgets for cooperative programmes have been dogged by inefficiencies. This is for two reasons. First, some countries have no money available at a particular time for the cooperative programme, or have different timescales for procurement. This can lead to delays, as in the case of the A400M, or even withdrawal of a country from a programme (e.g. the Brevel drone). Sometimes the scope of the cooperative programme is limited in order to hedge the financial risk. For instance, five of the six governments involved in the Meteor programme are financially committed only for the development phase. The more ambitious the financial engagement and the higher the number of countries involved, the greater the financial risk becomes. The second problem is that the budget approval in national parliaments often depends on the national politics of the moment, and sometimes budget approvals, and therefore programmes, are delayed for reasons which have nothing to do with the merit of the programme itself.

The objective of a common, multi-annual fund is to lessen the risk of budgetary shortfalls and the adverse effects of one government's deficits on the other countries involved. These funds should be managed by OCCAR, since this organisation is the main management body for many current cooperative programmes within Europe. Plus OCCAR will most likely manage most future cooperative programmes. However, for multi-annual programme budgets to work, they need to be based on five rules:

- (1) The contribution to the fund has to be approved by each parliament and has to be allocated in each national budget. Parliamentary authorisation would give a firm commitment for the first year and provisional commitment for the following three years.
- (2) If the priorities of the programme change and a government wishes to withdraw, it has the right to withdraw money committed for future years on a specific programme. This does not imply a reduction of penalties.

- (3) Governments contributing to multi-annual budgets would approve the budget each year on a programme-by-programme basis.
- (4) The IPT should have access to the budget, which would be banked according to OCCAR rules.
- (5) Each country's contribution to the fund is calculated according to the annual needs of OCCAR for the management of cooperative programmes.

Setting up multi-annual funds would slightly modify current practice, giving OCCAR and the IPT more flexibility for managing the project with better financial planning.

Make upfront investments and establish 'risk budgets'

The governments should also invest an adequate amount of their programme budget – as a rule of thumb between 10 and 15 percent – in the front-end of the programme, during the demonstration and development phase. Testing technology thoroughly at the start of a programme can help save money later, and allow governments to be firmer about delivery dates and in-service planning. Governments should also set aside a collective 'risk budget' (the amount would depend on the complexity of the programme), to cover any unforeseen emergency costs during the production phase of a programme. Integrated project teams (see project management section below) should manage at least some of the money in these budgets.

4.5 Project management

Use integrated project teams (IPTs)

The most successful project management is conducted by an 'integrated project team'. This team should integrate national experts and be permanently based at one venue. One of the main lessons from past cooperative programmes is that IPTs work best if they have a permanent location. This doesn't mean that all

IPTs (whether OCCAR or not) have to be in the same location. The Tiger IPT is located in Bonn, the FREMM and FSAF IPT are located in Issy-les-Moulineaux in France, and A400M is located in Toulouse. Most of the time the IPT is located in the country which is the principal customer of the programme, or within the country which is more or less the leading nation, or located near the place where the prime contractor or lead consortium has their main production factory or design headquarters.

The major advantage of IPTs is that the project team members are not representatives of their national governments. An IPT should have the power to manage a programme, which was not the case in the past with multilateral project offices. IPTs should be given authority for day-to-day decisions (including some financial decisions) although national capitals should keep authority over strategic decisions. The organisation of IPTs should be more hierarchical than previous multilateral project offices. As IPTs manage the programmes and conclude contracts with industry, each IPT needs a lot of different skill sets: operational (with the help of military staff), technological (with the help of engineers), financial, legal, industrial, logistics and so on.

Currently IPTs begin their work after the MoU is signed – defining the principal cooperative rules and the principal contract between the governments and industry. Sometimes the timeline between the two is very short, as was the case in the FREMM project. In fact the programme was transferred to OCCAR the same day the governments signed both the MoU and contracts with industry. But many officials interviewed for the purposes of this report said that an IPT should be involved as soon as the governments begin to elaborate the MoU and the contract.

Focus contracts on delivery

The traditional focus of programme contracts has been on meeting 'phases' of programmes, rather than on final delivery. If industry is involved in the requirements definition phase

from the beginning and governments are prepared to invest more money upfront in the research and development phase, then the focus of contracts should shift from predominantly meeting phases (process) to final delivery of the product.

Why has the traditional focus on meeting phases been a problem? Multiple phases multiplied contract negotiations, thereby causing delays, and MoUs were needed for each phase, for example the Trigat MP had six MoUs. However, even when reducing the number of phases and MoUs, necessary milestones will still need to be met by industry and governments (such as budget payments, and R&T demonstration on time). Changing mindsets does not mean that all phases are eliminated, but the focus shifts from the process of the programme to delivery of the final product.

Prefer prime contractors and ensure transparency for sub-contractors

Prime contractors are generally preferable to joint ventures because it should make it easier to clarify the allocation of risk between a group of governments and one company (rather than a group of companies). However, prime contractors must also be clear about allocating risk with their sub-contractors. Governments need to build on the EDA's Code on Best Practice in the supply chain (which forms part of the procurement code of conduct) and reach an inter-governmental agreement to guarantee transparency through the whole supply chain both from industry and the governments, and fair access to second-tier companies.

A European patent-style system for defence intellectual property rights

Intellectual property rights (IPR) often complicate cooperative programmes, because it is not always clear who owns the IPR. Governments should set up a secure Europe-wide patent-style system for defence IPR, covering both attribution and transfer of IPR, which would help foster a common market for defence technology

ideas and innovation and take into account the sensitivities of defence IPR (which does not come under normal commercial IPR patent rules, i.e. as laid down by the European Patent Office), and protect the know-how of companies to avoid technology duplication and/or distortion. These rules should simultaneously take into account three aspects: the governments' need to control the spread of technology and guarantee security of supply; the incentives for prime contractors to innovate and adapt different technologies; and the imperative for sub-contractors to protect their niche capabilities. A Europe-wide patent-style system would provide some common guidelines and clarity, but since each cooperative programme is unique, specific inter-governmental MoUs and agreements with industry will still be required in each case.

Coordinating national procurement processes

While it is difficult to harmonise national procurement processes, because of the political and legal obstacles involved, European governments could better co-ordinate the way they organise tenders and contracts for cooperative programmes. In particular they should pay attention to the following aspects:

- ▶ Develop a common cost-benefit analysis in order to determine which cooperative programmes should be launched. This analysis should take into account all budgetary effects, as well as the programme's ability to achieve all desired capabilities goals. This common cost-benefit analysis should have a positive impact to harmonise national procurement processes as it would be based on performance.
- ▶ Member States should avoid multiplication of national tenders when they choose a cooperative programme for their equipment. In this case, the EDA or *ad hoc* multinational teams should organise the competition.
- ▶ The OCCAR system of standard contract should be used for cooperative programmes;
- ▶ The EDA's code of conduct, if applied to cooperative programmes, would help

increase the transparency of the tender procedures and encourage more joint tenders and competition for contracts. This would also help the cost-effectiveness of a programme.

- ▶ If a government withdraws or downsizes its commitment to a cooperative programme,

they should pay a strong financial penalty to both industry and their partner governments.

- ▶ The coordination of procurement cycles is also essential. The EDA should facilitate an information exchange on national procurement cycle planning.

Annex

Abbreviations

DCI	Defence Capabilities Initiative
ECAP	European Capabilities Action Plan
EDA	European Defence Agency
ESDP	European Security and Defence Policy
ESS	European Security Strategy
GDP	Gross Domestic Product
HJPO	Horizon Joint Project Office
HMR	Harmonisation of Military Requirements
IPT	(i) Intellectual Property Rights (ii) Integrated Project Team
JSF	Joint-Strike-Fighter
LOI	Letter of Intent
MoD	Ministry of Defence
MoU	Memorandum of Understanding
NATO	North Atlantic Treaty Organisation
OCCAR	Organisation conjointe de Coopération en matière d'Armement
PAAMS	Principal Anti-Air Missile System
pMS	Participating Member States
R&D	Research and Development
R&T	Research and Technology
TEU	Treaty on European Union
UCAV	Unmanned Combat Aerial Vehicle
UN	United Nations
WEAG	Western European Armaments Group
WEAO	Western European Armaments Organisation
WMD	Weapons of Mass Destruction

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