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**THE RELATIONSHIP BETWEEN
PRIME CONTRACTORS AND SMEs**
**How to Best Manage and
Fund Cooperative Programmes**

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January 2018

*The views expressed here are solely those of the authors.
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Policy Paper

Within the framework of the objective of strategic autonomy for Europe and the constitution of a European defence technological and industrial base (EDTIB), the roles of prime contractors and SMEs in the arms industry are different but equally important. The objective of this paper is to describe these roles in the prime contractor/SME supply chain and propose a policy with regard to the EU funding of future European defence equipment programmes, Research and Technology programmes, Research and Development programmes, and even acquisition programmes, as currently proposed or considered by the European Commission, by way of direct EU funding or a European defence fund. This policy could be useful within the framework of the current proposals for, or reflexions on, the consolidation of the European arms industry.

INTRODUCTION

The Global Strategy for the European Union's Foreign and Security Policy presented by the High Representative Federica Mogherini to the EU Council in June 2016 nurtures the ambition of strategic autonomy for the European Union. As mentioned in this global strategy, a solid European defence technological and industrial base (EDTIB) is essential for Europe's strategic autonomy and for a credible CSDP, which means the existence of a sustainable, innovative and competitive European defence industry, including relevant prime contractors and small and medium sized enterprises (SMEs).

Within the framework of this objective of EU strategic autonomy, the roles of prime contractors and SMEs in the arms industry are different but equally important. The objective of this paper is to describe these roles in the prime contractor/SME supply chain and propose a policy regarding the EU funding of future European defence equipment programmes, Research and Technology (R&T) programmes, Research and Development (R&D) programmes, even acquisition programmes, as currently proposed or studied by the European Commission by way of direct EU funding or a European defence fund. This policy could be useful in the framework of the current proposals or reflexions for the consolidation of the European arms industry.

CONTRACTS WITH INDUSTRY FOR ARMAMENT PROGRAMMES

First, it must be clearly understood that government(s)-contractor partnerships for the development of major systems specifically designed for military use can be based only on R&D funding by government(s), that funding being decided by a government, or in the future by the EU, only if that authority has a desire to obtain a measure of national or shared autonomy. This is due to the fact that the defence market is quasi-unpredictable and, in most cases, military products require a very risky, costly and lengthy development phase: no defence company would, therefore, take the risk of funding an R&D programme, and customer (MoD) funding is the rule, except for simple systems where the market predictability might be considered acceptable and R&D costs might be lower compared to the expected turnover.

This specificity usually does not exist for the civil market, which is more predictable, except for very specific systems which, though civil, have similar characteristics to those of military projects in terms of costs, risks and impact on national or European autonomy such as navigation satellite systems (the European Galileo system, for example; the GPS, its American equivalent, is in fact a military system developed and owned by the United States Air Force) or space launchers (the Ariane family).

For many years, since no desire for autonomy had appeared in the defence sector at the European level, the idea of creating European tools for such autonomy—namely, European Union funding in addition to Nations funding for defence R&D (cooperative) projects—was theoretically appropriate, but not implementable.

However, European civil satellite (Galileo) and space launcher (Ariane) programmes have already shown that, when a desire for autonomy is shared at the European level, European R&D and production funding can be decided on and obtained and appropriate management tools and agencies can successfully deliver the related programmes.

Secondly, when a governmental authority in charge of a major armament programme (which may be an international agency for a cooperative programme, such as OCCAR – Organisation Conjointe de Coopération en matière d'Armement) negotiates the relevant contracts with the defence industry for that programme, the preferred and most efficient solution for the realization of the project consists in placing the contracts with a single prime contractor and ensuring that the contracts make the prime contractor fully responsible for delivering the products to the customer on time and in line with the agreed costs and specifications.

This means that the prime contractor must have full responsibility for the choice of its subcontractors, including of course SMEs (however, in most cases, for large programmes, SMEs may be sub-sub-sub... contractors). When this is not the case, for example if the governmental authority imposes the choice of a specific subcontractor (which may or may not be an SME) or places a separate contract with a subcontractor, then the prime contractor could not be held responsible for any failure of this subcontractor and for all the relevant consequences (delays, extra-costs) incurred for the main programme.

There are plenty of examples of programmes, national or international, where it has been decided to place separate contracts with subcontractors, or impose specific subcontractors on the prime, for reasons not necessarily linked to an objective of strategic autonomy and not supported by a robust technical and risk analysis, where these decisions have led to serious or even catastrophic consequences for the customer. In addition, this is not the best way to build a solid European defence technological and industrial base (EDTIB), as this situation usually either necessitates a change of subcontractor, in case of total failure of the initial one, or creates additional and useless duplication.

There are, however, cases where the customer may have to impose a subcontractor for reasons linked to its objective of strategic autonomy, for example for major security reasons (security of supply in particular). But this must be carefully decided after a risk analysis and even carefully prepared well in advance through anticipated R&T projects. If a Government (or the EU) wants to acquire a new technological competence required for its strategic autonomy, the best way to reach this goal and ensure that the technology would be ripe for the development of new systems, is to anticipate future technological needs and place relevant R&T contracts several years before the expected use of this technology in an R&D programme. To consider that it is possible to acquire or mature a new technology during an R&D programme is, in most cases, an illusion and not the safest way to obtain a successful result.

SUPPLY CHAIN: SOME *A PRIORI* ASPECTS FOR ACHIEVING GOOD ECONOMIC PERFORMANCE

As is well known, among the most important values for the proper functioning of the supply chain are trust among different firms and trust with the customer—MoDs—visibility of firms and actions, commitment and collaboration among agents and traceability of the different tasks being carried out. However, as defence production and

services are becoming more complex and competitive pressures growing stronger, companies must increase the added value they have to deliver to the customer.

Therefore, customer orientation—that is, value in use—must be the main objective of the whole supply chain. In this sense, changes or volatility of demand involve modifications within the whole supply chain, which has to respond in a fluid, interactive and multidimensional way. How is this type of response achieved at relatively low cost to the whole supply chain? There are two factors that seem to be significant in achieving this. The first relates to the demand side and, the second, to the different types of contract.

From the demand side perspective, the equipment and services required by the nations' defence systems should be combined. That is, demand should be pooled, so that supply-chain costs are minimized. Moreover, given that supply chains are increasingly global, there would be a trend toward cost reduction. Nowadays cross-border involvement of the SME is still scarce and may be a necessary condition for a deeper European collaboration. In this sense the EDF can favour this evolution taking in account the rules of efficiency of the relationship between prime contractor/SME's.

This aspect is particularly important for small countries, since it allows them access to inputs and provides new business opportunities for their companies beyond their own borders. Additionally, demand should be stable and possess a high degree of certainty in order to reduce associated risks. Finally, the technical characteristics would have to be known, and be as similar as possible for all nations, so that production and delivery processes remain as standard as possible.

These aspects are at the root of the policies developed by the European Commission in recent years. However, it is possible to go further in this direction by increasing the participation of SMEs and other suppliers that retain both the technologies and the supply of most of the production within the EU, so as to increase shared EU strategic autonomy.

Regarding the type of contracts, it is necessary to take into account that manufacturing companies are undergoing a *servitization* process. This aspect is of special importance in the defence industry, since the life cycle of weapons systems is quite extended and requires continuous upkeep and maintenance services. The so-called Outcome-based Service Contract (OBC) allows the customer to pay only when the firms have delivered outcomes, rather than merely for activities or tasks—Ng and Nudurupati (2010). It obviously requires changes in companies' behavior and in the supply chain, since the relationship with the customer (MoD's) has to be very fluid in a co-creation process in which the share of responsibilities and risks between both may change significantly.

As outlined by Christopher et al. (2006), the choice of a global supply-chain strategy has to change towards “replenishment” of lead-times and predictability/variability of demand. Whilst previous taxonomies have tended to focus on the nature of the product and its life cycle, we suggest that these can be further enhanced by the use of lead-time and demand “variability measures”. In this sense, the pooling of demand, budget stability

and an adequate knowledge of the supply chain would enable a better relationship between primes and SME/subcontractors to result in an improved outcome for the customer.

BUILDING UP AN EU DEFENCE SUPPLY CHAIN: PROBLEMS AND SOLUTIONS

As has been previously stated, one of the objectives of the EU defence industrial policy is to create a solid European defence and industrial base (EDTIB) to reinforce Europe's strategic autonomy. In this sense, industrial policy instruments must be aimed at improving the competitive capacities of companies, both primes as well as subcontractors and SMEs that constitute a substantial part of the supply chain¹. This involves being aware of, and trying to solve, some problems that currently affect the defence industry supply chain. Some of these problems do not have a solution in the short or medium term, but it is possible to mitigate them through the design of instruments that reduce their negative impact on the behaviour of the agents involved. Some of these instruments may be or are already partially incorporated into the European Defence Action Plan and the European Defence Fund, but others require a deeper analysis for their possible incorporation. Some of these problems can be summarized as follows:

In terms of the supply chain, the choice of subcontractors/SMEs is crucial to achieving a competitive defence industrial sector

From an industrial point of view, even without contractual constraints arising from governmental contracts, it should be in the long-term interest of any responsible prime contractor to establish and maintain trustful contractual relationships with a reliable and close environment of subcontractors/SMEs which would be able to bring innovation and new technologies and respond efficiently and competitively to its needs for the development of new systems. However, the short-term policy of big companies may not be compatible with this long-term view: to reduce its own costs or risks on a particular program, a Prime Contractor might be tempted to choose a subcontractor outside its national or European environment, even if a national or European subcontractor would be able to provide a similar subsystem, maybe at a slightly higher cost or risk.

Obviously, in the civil world, where industrial entities invest their own money in future projects, it is their responsibility to optimize their strategy and make decisions between contradictory long-term and short-term objectives. The problem is different in the

¹ The importance of SME's in the defence industry may be approximated by the share of their value added. In 2006 it was: one-third of the average for manufacturing in weapons and ammunition, the same in shipbuilding and repair and one-sixth in the aircraft and spacecraft sector. Europe Economics (2009).

military world where the investment comes from the customer and where the more general objective of strategic autonomy may or even should drive the customer to introduce some rules in the contracts with primes to satisfy this overall objective.

Indeed, even for some civil strategic programs which are entirely funded from the EU budget, such as Galileo, , specific rules may be established to take into account high level political objectives in line with the strategic features of the program (see Galileo Regulation N° 683/2008 of the European Parliament and of the Council of 9 July 2008).

For a military programme that is funded by a governmental customer, either national or international (for a cooperative program), it is the responsibility of the customer to decide and negotiate with the prime contractor the contractual rules which should structure the relationships between the prime and its subcontractors and limit its freedom of choice, such as limiting the competition for subcontracts within the programme to Participating States or within the EU, when competitive products exist in those states. These limits are mainly linked to the objective of strategic autonomy pursued by the customer for the use of the system (security of supply) and for any future export decision; they may also be linked to the need to protect sensitive or classified information. Encouraging cross-border subcontracting in Europe is of interest, but it must be done in a way that does not make the supposedly autonomous system ultimately dependent on third countries' laws and policies through ill-chosen subcontractors. Of course, the limits imposed on competition at subcontractor level also ensure that the contract will have a positive impact on jobs in the programme's Participating States, without imposing—as was frequently done in the past for cooperative programmes—the inefficient “juste retour” rule.

In addition, to ensure that the prime contractor respects the terms of the contract, a specific and transparent reporting to governmental authorities must be established: in particular, concerning the choice of its subcontractors (SMEs or not), although the ultimate responsibility of the prime should remain, the prime must provide all necessary justifications of its decisions, especially when there would potentially be an impact on the main objectives of the programme.

A good example of these contractual rules—although some improvements (concerning, in particular, the reporting to the Customer) have been introduced to the initial contract (signed in 2003) through an amendment signed in 2011—is provided by the A400M program, managed by OCCAR on behalf of six nations (Belgium [acting also for Luxembourg], France, Germany, Italy, Spain, Turkey and United Kingdom): a single industrial prime contractor (Airbus), being tasked to choose its subcontractors under its own responsibility (within some limits relating to autonomy and security issues, but with no “juste retour” rule, as this rule is banned by the OCCAR Convention: this meant in fact a preference for subcontractors from the Participating States or Europe) and to report adequately to OCCAR and the Participating States. Although such rules do not totally prevent wrong choices and technical difficulties due to these wrong choices, and also the

usual technical difficulties which are met when a new system enters into service as with any other ambitious project, and can always be improved, as is shown by experience, a comparison of the A400M programme with previous (national or cooperative) programmes of similar size and ambition clearly demonstrates the progress and advantages these rules have afforded.

Thus, both in the case where the prime chooses the subcontractors and in exceptional cases where the customer chooses them, it is necessary to monitor the supply chain at least as far as third suppliers, in order to give visibility to potential problems or vulnerabilities—Domini et al. (2012)—since the governmental customer's perspective, either national or through international agencies, tends to be more general. This may help to reach adequate functioning standards. In addition, an adequate choice of subcontractors enables greater added value to be delivered to the customer and reduces the risk of delays and quality problems.

The structure of the market is mostly oligopolistic and, in some cases, monopolistic, which hinders relationships between companies

It is very difficult to modify the structure of the market, particularly in those segments where there are important national monopolies such as aeronautical and naval industries. At the European level, it is possible to reduce its impact on the supply chain through at least two instruments. The first involves improving the treatment given to property rights and their exploitation. The second has to do with the problems of existing information flows—the problem of information asymmetry—that limit the possibilities of obtaining benefits or entering niche markets that are new to SMEs. In this case, long-term contracts, such as the A400M contract (R&D and acquisition contract) or the Outcome-based Service Contract (OBC) may be useful since the proper functioning of the supply chain requires continuous flows of information and a high level of engagement between the customer and all the companies in the supply chain.

Regarding the customer perspective, the outcomes related to the existence of these market structures seem ambivalent. On the one hand, they maintain a certain level of security in the supply but, on the other hand, they raise system acquisition prices.² Thus, a supply chain in which information is transmitted in an agile manner tends to reduce acquisition costs for MOD's.

Access by SMEs to R & D funds

Another issue which mostly concerns defence SMEs must be taken into account. As the EU recognizes, SMEs are key agents in economic growth and innovation and their

² An analysis of the effects of monopolies in the supply chain for the UK may be found in Humphries and Wilding (2004).

development is, consequently, of great importance in the context of the defence industry. In this sense, it is necessary to deepen the lines of financing of *ad hoc* R&D for the SMEs, increasing both their participation in European programmes—even generating a programme of cross-border technological collaboration in defence just for SMEs—as well as distinguishing them from the large companies that mostly receive government funds for their own R&D and positively discriminating in their favour in some way.

When autonomy is funded at the prime contractor level through an R&D contract, cascading R&D funding to the various levels of subcontractors is an absolute necessity and must be organized or controlled by the contracting agency which represents the customer. In major systems such as aircraft and ships, about 70% of the system is subcontracted (partially to SMEs). This means that a very significant part of the funding provided to the prime must be cascaded to the subcontractors, particularly to the SMEs, which are mostly unable to fund their own R&D part of the programme in advance.

It is necessary to emphasize two aspects, though the instruments and lines proposed in the European defence industrial development programme (EDIDP), those being considered for EU funding of future European defence programmes, Research and Technology (R&T) programmes and Research and Development (R&D) programmes, are useful. The first relates to the weakness of SMEs compared to primes in terms of obtaining funds for R&D and would require a set of actions and specific controls aimed at reducing that gap. The second has to do with modes of financing: through the prime contractor (which is, in this case, responsible for cascading the R&D funds but must provide adequate reports to the customer) or via direct payments by the procurement agency to the SME.

In some specific cases, when an SME absolutely needs R&D funding, the only way to guarantee this cascading at the proper level may be to organize direct payments by the procurement agency to this SME, even if the SME remains contractually a subcontractor of the prime: this solution has already been used in the past by national MoDs.

It is clear that it would be more efficient to organize sub-contracting on a European basis and that it would also help potential defence subcontractors from countries where no major prime contractor is present. However, the A400M programme has also demonstrated that the cascading of R&D funding may sometimes be unsatisfactory for some subcontractors and some of them may have to invest their own money during the R&D phase and wait for the production phase before they get a proper return on their investment: in this particular case, these SMEs may need some financial guarantees, and it would be very attractive for European SMEs if these guarantees could be provided through adequate EU financial instruments under the proposed European Defence Industrial Development Programme (EDIDP).

“Dual use” of the supply chain: complementarities in civil-military markets

There is a significant relationship at the subsystem/subcontractor level between the commercial and defence markets in some systems, such as engines, composites, RPAS, cybersecurity, etc. Hence, the military and commercial markets for most of the equipment and services exhibit extensive overlap. This situation generates a double effect. On the one hand, it allows the supply chain to have a greater number of potential companies that can substitute for each other if necessary—for example, in the case of companies exiting the market as a result of substantial increases in prices or reduction in quality. On the other hand, it can pose security problems with commercial companies that do not usually work in the defence industry and whose security standards are generally lower than in the defence industry.

Similarly, different programmes can use similar subsystems and benefit from a supply chain which is already established and can substantially reduce costs for both the industrial side (prime and subcontractors/SMEs) and the customer. Therefore, it is necessary to identify and take advantage of these synergies that can stimulate cross-border collaboration.

R&D intensity: preparing SMEs for future R&D complexity through early R&T projects

The high technology content of most of the defence sectors combines with a complex network of interdependencies that present considerable barriers to new entrants. In contrast, some other sectors have traditionally been characterized by low barriers to entry. This is especially true in the case of SMEs that comprise the industry's pool of subcontractors³.

Sectoral differentials of technological complexity impose discriminatory characteristics in the supply chain, when compared to sectors at a lower technological level. Among these is the need to have a highly qualified workforce that tends to move from SMEs to larger companies due to the greater employment opportunities they offer. This decapitalization of SMEs intensifies in the common case where larger companies acquire small, highly innovative SMEs with the aim of controlling new technologies and expanding their market share. So, the trend towards higher market power tends to relegate the smaller companies to the bottom of the pile, even when they can be highly innovative. However, firms of this kind are necessary because of their innovative dynamics: they are informal, flexible and agile. Yet, from an industrial policy point of view, it may be useful sometimes to stimulate this kind of behaviour when security in the supply of key technologies could be put at risk.

³ For a sectoral comparison see Green et al. (2006).

Finally, depending on the type of technologies and the market addressed by them, some specific SMEs may need some R&T funding to prepare future technologies before new programmes are launched. This means that R&T government funding should be provided directly to these SMEs several years before the envisaged technology can become sufficiently mature to be used in an R&D programme. For R&T funding, placing a contract with a prime contractor which would include direct payments to specific sub-contractors may also be envisaged. All these solutions adequately prepare SMEs for future competitions organized by prime contractors for the development and production of future large systems.

CONCLUSION – POLICY PROPOSAL

Industrial defence policy, like any other industrial policy, has to combine various aspects in order to achieve its objectives—employment, innovation, international trade, investment, etc. However, the complexity of this policy is greater due to a variety of factors, including the inherent security issues, the need for international cooperation and the prospect of building competitive European armed forces, the ultimate aim being EU strategic autonomy, as mentioned in the Global Strategy for the European Union’s Foreign and Security Policy.

To achieve that aim, the EU will have to fund future European defence investment projects, Research and Technology (R&T) programmes, as already launched by the European Commission and the European Defence Agency with the “Preparatory Action” and also Research and Development (R&D) programmes—and even later acquisition programmes, as currently being considered by the Commission. In this context, the supply-chain-related aspects are of special importance, since a large part of the capacities of the armed forces of the countries depend on them, as does the security of European citizens.

Considering the specificities of the armaments field and the objective of strategic autonomy, policies aimed at improving the resilience and efficiency of the supply chain must consider the following aspects:

1. The development and efficient operation of the supply chain need a reliable demand framework with the participation of a broad group of nations and an adequate forecast of defense spending for this group of nations, as envisaged in the PESCO commitments.
2. Without weakening the responsibilities of primes in the defence sector, it is necessary to reinforce and monitor the supply chain in order to increase the security of supply. To this end, European policy needs to strengthen the control

procedures, so as to improve the balance in the respective roles and participation between primes and subcontractors/SMEs, identifying potential defence supply chain bottlenecks and planning actions and R&T projects to prevent disruption. This particularly concerns the choice of subcontractors and the cascading of R&D funding in major armament programmes.

3. It would be important to stimulate, through *ad hoc* instruments, the participation of SMEs in innovative defence projects to take advantage of the flexibility of smaller companies that can drive the creation of new technologies. These instruments may take different forms:
 - financial guarantees, provided during R&D phases by EU financial instruments under the proposed EDIDP when the cascading of R&D funding by the prime does not cover the SMEs funding needs;
 - early R&T projects funded well in advance of R&D programmes and specially focused on innovative SMEs.
 4. Finally, taking advantage of the "dual use" of the supply chain between civil and defence products through greater monitoring could lead to a situation of potential savings without reducing levels of security where the supply is concerned. ■
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ARES GROUP

The Armament Industry European Research Group (Ares Group) was created in 2016 by The French Institute for International and Strategic Affairs (Iris), which coordinates the Group. The aim of the Ares Group, a high-level network of security and defence specialists across Europe, is to provide a forum to the European armament community, bringing together top defence industrial policy specialists to encourage fresh strategic thinking in the field, develop innovative policy proposals and conduct studies for public and private actors.

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