SERA 29
SESSION EUROPÉENNE DES RESPONSABLES D’ARMEMENT
REPORTS
A new paradigm for defence cooperation in Europe: Which drivers and how to proceed?

This document compiles the reports drafted in 2017 by the 29th SERA auditors on the general theme "A new paradigm for defence cooperation in Europe: which drivers and how to proceed?" and its subthemes.

Views and recommendations expressed in this document are those of the committee's members. In any case, this content reflects neither national policies of any SERA nation, nor positions of any company.

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I am pleased to address my warmest thanks to the 29th "Session européenne des responsables d’armement" auditors and to the involved councilors, for the work carried out throughout this year 2017.

For more than four weeks, in France, the United Kingdom and Poland, sixty-six attendees from twenty-two countries have created a genuine community beyond their origins, nationalities and respective functions. During these weeks, with humility, they chased the same objective: bringing their small building block to the edification of the Europe of Defence.

The present reports reflect their commitment and their thoughts to this aim, at a time where this subject becomes a priority for the Europeans and Europe’s leaders, working together to build a credible Defence Union.

I wish the Sera auditors a fruitful career. I am convinced that these weeks will help them in their functions and careers in the future.

Sincerely

Lieutenant General Bernard de Courrèges d’Ustou
IHEDN Director
General SERA presentation

European initiative under the responsibility of the IHEDN, the French "Institut des hautes études de defense nationale", the "session européenne des responsables d’armement" aims to broaden the links between European nations which are planning to co-operate on military procurement programmes since 1989.

The SERA provides senior managers involved in defence equipment matters and in European collaboration with an environment for training and reflection, meetings and uninhibited discussion with the aim of strengthening the European outlook in matters concerning defence and defence equipment and to improve mutual understanding between partners.

This training is provided over 4 weeks, distributed over 5 months between February and June, in France and in two other European countries.

It relies on an original and interactive method built around a group of activities linked to a central theme:

- Conferences intended to supply information to the auditors, followed by an exchange of opinions with the speaker.
- Visits which give an insight into certain aspects of the defence industry and the organization of the armed forces.
- Committee work where each committee (groups of 10 people from different nationalities) is in charge of studying a defined subject whose conclusions are presented at the end of the session in June.
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Committee 1

European security and defence research resources and their impact on research, development and technology

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Executive summary

The main theme for SERA 29 is "A new paradigm for defence cooperation in Europe – which drivers and how to proceed?". Within this global theme, Committee 1 is to investigate the sub-theme of "European security and defence research – resources and their impact on Research, Development and Technology (RD&T)."

This paper makes a number of recommendations in that regards. Defence R&D cooperation should not be limited to the EU: that synergies should be sought across Europe between organisations and civil and military R&D. A lean model of governance should be applied, whereby a limited coordination and planning staff would be supervised by an independent R&D Investment Board manned by R&D managers on a rotational basis, and supported by an R&D Advisory Committee involving the European industry in order to ensure governmental and private R&D initiatives are complementary. In addition, a network of R&D centres of excellence should be established, maximizing cooperation and smart specialisation, in order to implement, in cooperation with the European defence industry, the projects approved by the Board.

Governmental funding should focus on projects in the TRL4-6 or lower in order to be complementary with the efforts of start-ups/SME and of the larger defence industries, and could apply the pre-commercial procurement approach combined with X Prize incentives. This focus would also help training and retaining the necessary human resources. A cooperative model whereby a mobile workforce and the necessary and expensive technical infrastructure could be shared by governmental agencies, industry and R&D centres of excellence should be encouraged.
Introduction and Research Questions

Military and security forces need very specific equipment, education and training to perform their missions. This equipment (e.g. weapons, protective equipment, encrypted communications, simulation software) or services are always the result of research and development (R&D) activities, especially in a world where threats and requirements evolve quickly. The road from R&D to a useful product can be long, far from straightforward, and rely on several different resources to achieve its intended results, as can be seen in figure 1. The most obvious resource is funding, which is deeply depending on the policy-based R&D budget. R&D funding, in particular its source, is a subject widely discussed either on a national or a transnational level. Indeed, discussions of defence R&D within the European Union (EU) usually focus on the inadequacy of funding and cooperation(2), on the new “research window” of the future European Defence Fund aiming to fund collaborative defence research projects at the EU level(3), and on the possible role of the European Defence Agency (EDA) in managing R&D projects(4). However, other resources needed for successful R&D, such as human resources in terms of availability and competence, technological infrastructures, and the role of centres of excellence are more

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(1) In this paper, as explained in the definition below, we will use the more common acronym “R&D” as a synonymous for “RD&T”, but a more accurate acronym would probably be “RT&D”

(2) F. Mauro and K. Thoma, The Future of EU Defence Research (European Commission, March 2016), §§2.1, 4.2-4.3; European Union Institute for Security Studies (Rapporteur), European Defence Research – The case for an EU-funded defence R&T programme (EUISS, 2016), §§3.1-3.2


(4) European Union Institute for Security Studies, European Defence Research, §4.2
seldom discussed. Therefore, this paper will critically analyse those various aspects of the R&D process and make proposals on how to better use those resources in a European context. Even though the EDA adopted about ten years ago a European Defence and Technology Strategy\(^{(5)}\) that included a number of good principles, it is not entirely clear if this strategy has produced many positive results\(^{(6)}\).

It is widely recognised that defence R&D in Europe has to be optimised\(^{(7)}\). Because of parallel defence R&D and military equipment development that remained highly fragmented along national lines in the past decades, available resources for R&D have not been used optimally. Traditionally limited defence budgets, rapid rate of technological changes and increased international competition present Europe’s defence industry and research centres with major challenges. This has consequences both for the defence sector and European countries: disadvantages with regard to international competition, an unsatisfactory cost structure in the projects and, as a result, a greater burden on national defence budgets. The particular competencies required for acting in the defence market require a permanent gathering and cross-checking of information and a continuous dialogue between industry and ministries of defence, in particular to ensure a proper understanding of threats. The barriers to entry in the market are high because of the required initial investments and the time needed to acquire the required competencies.

Indeed, nearly exclusively driven by State demand, the defence supply chain cannot be analysed using a classical market approach. In defence R&D or equipment acquisition, public funding represents the vast majority of the investments in the market. Project duration and risks, combined with a high level of necessary funds, would not allow autonomous financing (self-funding). Therefore, public R&D investments play a key role in the defence equipment market. Within the defence area, the main goals of the R&D are:

- Bringing forward the knowledge needed to meet future military challenges and threats;
- Bringing about the most needed capabilities giving a decisive operational advantage to the forces and satisfying its operational needs;
- Reducing risks in procurement programmes that have to incorporate new types of technology;
- Improving the scientific, technological and industrial base (including different resources like human capital and knowledge management) in the capacities that have been considered as strategic (defence science and technology gives an important impulse to industry at large and contributes to the economic growth with a multiplier effect).

The EDA defines R&D expenditures as expenditure for any R&D projects up to the point where expenditure for production of equipment starts to be incurred, and Research and Technology (R&T) as expenditure for basic research, applied research and technology demonstration for defence purposes (it is a subset of R&D). The defence expenditures of EU Member States

\(^{(5)}\) European Defence Agency, European Defence and Technology Strategy, 10/11/2008  
\(^{(7)}\) Mauro and Thoma, *The Future of EU Defence Research*; EU Institute for Security Studies, European Defence Research
amounted to an average of about €196 billion yearly in the period 2005-2014. Of that amount, an average of about 4% (€7.5-9.8 billion per year) was used for R&D. As subset of R&D, R&T accounts for about 1% of the defence expenditures of EU Member States (about €2.2 billion). Of this R&T expenses, an average of 86% is performed nationally, 12% through multinational collaboration involving in majority EU Member States, and 2% through non-EU collaboration. The EU aims to increase defence R&T spending to 2% of all defence expenditure and to bring European collaborative defence R&T spending to a level of 20%\(^{(8)}\). By contrast, the United States, which is spending €450-500 billion a year on defence, spends an average of 11-12% of that amount (€50-60 billion per year) on R&D\(^{(9)}\).

The R&D process is often structured around nine Technology Readiness Levels (TRL). The TRL scale is used to assess the maturity of a particular technology and to allow consistent comparison of maturity between different types of technologies, as shown on Figure 2\(^{(10)}\). The research (R) phase of R&D can be divided into two stages. The basic research stage (TRL 1-3) is where new technological concepts are formulated and their feasibility tested. These activities are usually performed in universities, basic research centres, spinoffs, etc., namely the scientific base. The applied research stage (TRL 4-6) is where concepts are proven thanks to technological demonstrators. These activities are usually performed in applied research centres, SME, large companies, etc. namely the technological base. Together, those two stages actually form the R&T. The development phase (D) of R&D (TRL 7-9) seeks to demonstrate in a prototype that certain technologies can be industrialised and are exploitable in a real operational environment.

\(^{(10)}\) See also Mauro and Thoma, *The Future of EU Defence Research*, p.13
These activities are usually carried out in SME, large companies, etc. namely the industrial base. A technology must reach the equivalent of TRL 7 before it can be included in a program to develop a new capability\(^{(11)}\).

Thanks to innovation, in many cases, new technologies tested during R&T will be applied in the development of new, and more competitive products. Such innovations are performed in SME, large companies or Centres of Excellent, which are spaces created for the development of innovative solutions and the approach of the technologies to strategic industrial sectors. Innovation can be achieved in two areas: to be more competitive, developing products more efficient and attractive than others, or to be more productive, improving the organization and its work processes.

As stated at the beginning of this section, there has been little focus on the availability and efficient use of the non-financial resources needed to actually realize defence R&D projects. Therefore, this paper will critically analyse the following research questions, within a European perspective (not limited to the EU):

- ✓ Which resources (human resources, technical resources, R&D centres of excellence, …) are required for performing common defence R&D in Europe?
- ✓ How should common defence R&D be managed and coordinated at the European level, including the EU member States and non-EU member States, and with R&D centres of excellence in order to ensure the availability and the most efficient use of those resources?
- ✓ Which levers can be used to increase cooperation and efficiency in defence R&D in Europe?

In this paper, "Europe" is defined as the European Union and its associated countries like Switzerland and Norway. EU defence goals and aims are also defined by NATO-EU cooperation, where partners agree not to duplicate capabilities and resources, and where NATO provides to EU members States the needed strategic deterrence and territorial defence.

In addition, this paper will touch the important issue of Intellectual Property Rights (IPR) for defence R&D performed in common.

\(^{(11)}\) But see the different definition in the Defence and Security Procurement Directive 2009/81/EC, OJ 2009 L216/76, Article 1(27) and Recital 31, which limits the definition of R&D to TRL 1-6
Which Resources does Europe need for Common R&D?

Human Resources Needs

Human resources – expert knowledge, competence and experience – are a restraining factor when it comes to R&D in general. Add to this fact the very special environment of R&D in defence research, specific and specialized needs, and the desired factor of experience and domain knowledge that are crucial in the defence context. If adequate human resources are not available, competent and motivated, no useful and timely R&D results will be achieved, even with lots of funding. Rebuilding lost human resources takes a long time. Various factors must be considered to both develop and maintain expert competence. We examine them here.

Education and Recruitment

Specialized competences are often needed for bespoke defence R&D, and there might not be a specific existing educational programme that suits the purpose. Instead, in-house education might be needed (added), which often makes specific competences more expensive and unique.

A solution could be a European initiative to raise attractiveness for students to focus on knowledge relevant to defence and security and become long-term experts in these areas. Common European-funded cooperative education programmes could be combining classroom-based education at universities with practical work experience at defence companies and in specific defence R&D projects. In this model, the student would also be a part-time paid employee of the company from the beginning of his education, and be assigned tasks according to his growing abilities. If a company is willing to sign an employment contract with the student after his education period, it would get an employee who knows the company’s workflow and has the specific skills on military technologies. Because of their existing working relations there is a big chance for the company that the former student will be willing to sign a follow up contract. In addition this cooperation model would support knowledge exchange between universities and industries.

Such model must also facilitate moving around Europe to find R&D projects fitting the human resources pool. This is a precondition and basis for creating competence-based European centres of excellence, avoiding duplication of resources, and ensuring that emerging centres can benefit from a larger pool of human resources. Creating incentives to motivate people with particular defence related skills to move around Europe would indeed contribute to better sharing of knowledge across borders. This type of defence R&D “Erasmus” could apply not only to students, but also to professionals at any stage of their career, and would encourage the spreading of best practices and information.

Evolution of Knowledge

Another complicating factor is how to build sufficient competence of the researcher and sustain it over time. Here, processes for transfer and exchange of knowledge and experience are crucial in combination with adequate plans for competence development.
In addition, in defence R&D, operational knowledge – to know the environment and the problems armed forces and defence organizations must face – is essential. This knowledge can be acquired to some extent by education but experience and a good dialogue with the “end-user” is often the best way to adapt the needs from the field. This is important knowledge regardless of whether the R&D is in a low or high TRL. Lower-level TRL can generate good input to higher-level TRL, which is crucial to coordinate R&D projects over time.

From a R&T point of view, it is very important to foresee what the future threats are going to be. A prospective effort is needed in order to clarify the future missions of the armed forces and so to know what future capacities are going to be necessary to address those threats. In parallel, a continuous monitoring of the evolutions of science and technology will allow identifying the possible necessary future technical solutions for the future capacities. Innovation, and especially disruptive technologies, is very important to shorten the developing time and to get more powerful capacities.

Not always a "Normal Research Environment"

R&D in the defence area is not usually comparable to the research environment in the civil sector, as it involves a variety of security aspects, from protection of essential information national security to industry confidentiality, which may make publication in peer-review papers impossible and renders R&D studies only available to a very limited number of persons. Factors that affect researchers have also to do with public concerns: the research being performed might be targeted by groups and organizations that question the needs and purpose of the research as well as the results themselves. Dissemination of knowledge within the defence R&D area is therefore an issue that should be tackled.

Technical Infrastructure

The need for adequate, specialized and robust technical infrastructure is not unique to defence R&D but may face different problems than civil R&D when it comes to maintaining and developing facilities over a longer period, as budgets for defence R&D fluctuate more than in civil research, depending heavily on political decisions and defence budget constraints. Also, some technical infrastructure for defence R&D is specific to the defence field, and synergies with civilian R&D infrastructure are in many cases not possible.

One other issue is the need to ensure that expensive technical infrastructure is available before even one single researcher can start to work in the facility. The necessary investments may be regarded as too expensive if they are new (questioning cost-benefit) and/or too expensive to maintain (for instance, when an investment decision was made by another political party). Some infrastructure is also very specialized, only suited for one specific type of R&D, which makes it vulnerable to national defence budget cuts. National solutions for defence R&D infrastructure are therefore more and more difficult to maintain. Research facilities in defence R&D might also be regarded as objects of national security, which makes them more expensive to protect and more difficult to share with foreign researchers.
Centres of Excellence

After the collapse of the Iron Curtain and the supposed outbreak of permanent peace in the world, the number of firms involved in the armaments industry diminished, either through mergers, acquisitions or the reorientation of their products towards the civil market. As a result, the need for specialized employees in the defence industry (e.g. engineers and scientists) has fallen sharply in the past decades. At the same time, shrinking defence budgets have limited the resources to invest in new defence technologies.

Defence R&D often has to deal with niche technologies. Especially when they have no dual use aspect, it is less attractive for science institutions and industries to focus on those areas. Because of this, nowadays the main research and development takes place in non-military sectors.

This shrinking of the European defence industry led to the problem that no specific technical knowledge in the field of defence is now taught at European universities. In Europe, professorships for specific military technologies (e.g. radar technology) are marginal, have sometimes completely disappeared, and the needed skills have therefore to be acquired on-the-job. Another possibility is to study abroad, most notably in a country with a large defence industry (e.g. the United States) where the arms industry is still a relevant part of the national economy and therefore universities have to satisfy the greater demand for specialists in the field of defence.

However, these well-educated specialists often do not return to their home country because of the limited job perspectives. It is therefore necessary to put together specific R&D training and to maintain the acquired knowledge within Europe in centres of excellence. A centre of excellence is not a continuing education institution at university level in the classical sense. It represents a group of persons, an institution or an entity, which are focused on the solution of a specific technological problem over a period of time (full- or part-time). Such centres should be established in close cooperation with the European armament industry and universities or existing research centres. In addition to that, a European initiative should be launched to identify and prioritize military niche technologies and fund centralized professorships and R&T projects for such technologies at European universities.

Such setup would take into account the fact that many European countries are smaller states that would not be able to build or keep the knowledge in each defence R&D domain. This would create the necessary momentum to build and maintain the essential knowledge and expertise (intellectual capital) within Europe. As it is not reasonable and efficient to duplicate small centers in every European country, the aim should be to centralize the best competence leaders in centers of excellence for specific topics, and to focus funds and other resources to develop their competences, rather than share small pieces of the cake with every country across Europe, as has too often been the case in the past.

Adequate synergies with local Small and Medium Enterprises (SME) would also foster centres of excellence and could spur concrete innovations remaining within the realm of practical realizations. An important question is towards which TRL levels the activities of such centres of excellence should focus on.
Funding

Even though this document does not discuss the sources of funding for defence R&D\(^{(12)}\), we should discuss how the available funds are to be used in the most efficient manner.

It is important that EU or other governmental funding does not stifle or replace R&D funding from industry: those sources of funding must be complementary. Ideally, part of the research could be financed by EU/governments and another part by industry. In this case of joint financing, IPR issues would have to be assessed more deeply.

In addition, common R&D funding should be focussed towards the most useful R&D areas and TRL. In a world where everyone has to "do more with less", it is necessary not only to define priorities for in which areas R&D has to be performed, but also at which stage of the R&D process (at which TRL) the common funding would be most useful, taking into account possible synergies with commercial entities. How these priorities are defined is a critical element of common R&D.

It would be more efficient to focus funding on a few centres of excellence, rather than to distribute limited funds to many small groups or institutions. There are already good examples of this focussed approach in the world, such as the NATO Cooperative Cyber Defence Centre of Excellence in Tallinn, Estonia\(^{(13)}\), or the USA Third Offset centres near existed competence centres\(^{(14)}\).

How to Organize Common R&D Management in Europe

Synergies between Ministries of Defence and the Commission (and relevant EU agencies such as the EDA) should be further promoted in the field of dual-use capabilities when it comes to civilian and military requirements setting, technological development and regulation (RPAS air traffic insertion, GOVSATCOM).\(^{(15)}\) Common defence R&D could foster the development of new dual-use capabilities where such synergies can be achieved between the civilian and the military domains in compliance with their respective specificities. These capabilities should benefit both the Common Defence & Security Policy (CSDP) and other EU policies (e.g. contribution of space-based capabilities or services to maritime surveillance).\(^{(16)}\) The participation of other European (non-EU) States should be ensured, and common European defence-related R&D initiatives should be coordinated with NATO to avoid duplication and therefore less efficient use of resources.

\(^{(12)}\) For that purpose, see EU Institute for Security Studies, *European Defence Research*, Ch.5

\(^{(13)}\) See https://ccdcoe.org and more generally http://www.nato.int/cps/ic/natohq/topics_68372.htm#, accessed on 17/06/2017

\(^{(14)}\) K. Hicks, A. Hunter et al., *Assessing the Third Offset Strategy* (CSIS, March 2017)

\(^{(15)}\) See https://www.eda.europa.eu/Aboutus/how-we-work/civil-military-cooperation, accessed on 23/04/2017

\(^{(16)}\) See the initiatives already taken by the EDA to supports access to European Structural and Investment Funds for defence industry, in particular SME: EDA Fact Sheet, "European Structural Funds for dual-use research", 12/12/2013, at https://www.eda.europa.eu/docs/default-source/eda-factsheets/2013-12-12-factsheet_est_highF224968C0825, accessed on 23/04/2017
As regards dual-use research, coordination of research activities between the EDA and the different Programme Committees under Horizon 2020 should be further strengthened. Indeed, it is crucial to ensure a close cross-fertilization between civilian, dual-use and military R&D initiatives. The EDA could be invited to provide ideas for relevant Horizon 2020 work programmes on a more systematic basis. Synergies regarding "Key Enabling Technologies" are to be enhanced. The EU should consider within its programmes how to best support wider defence innovation, in view of reaching out to potential commercially-driven breakthrough technologies and ensuring their effective inclusion into defence products. The proposed centres of excellence should be coordinated by the EDA, which would allow for the alignment of the R&D projects with the long-term requirements of the EU capability development plan. Funding itself can be provided via the European Commission, but in a simplified way and with much less bureaucracy than for Horizon 2020 programs.

The management of European R&D should ensure a wider support to the EDTIB (including key skills and competences) by ensuring the eligibility of all defence-related industry in Europe (including from non-EU member States), including SME, for EU funding tools. It will be crucial that the measures taken benefit entities that effectively bring added-value within Europe and contribute to strengthening the EDTIB in order not to offer an undue competitive advantage to third countries’ interests.

More widely, the European Commission, based on its technical expertise, could support work on identifying and investigating further potential incentive mechanisms. In that context, the setting-up of a defence fund with contribution from the EU budget is to be realised, building on Member States’ on-going work within the EDA. There is a need to consider ways on how to facilitate support by the European Investment Bank to cooperative programmes in the future. Allowing a systematic VAT exemption for European defence R&D and excluding such R&D expenses from the calculation of national budget deficits when assessing the EU convergence criteria would also be useful incentives for European R&D.

\[(17)\] Horizon 2020 is the current civilian research and innovation funding programme managed by the EU and provides nearly €80 billion over 7 years (2014 to 2020) to civilian R&D programmes, see European Commission, Horizon 2020 In Brief – The EU Framework Programme for Research & Innovation (European Union, 2014)


\[(21)\] J. Coelmont, "What are the missing instruments to reach another level of European defence?" (2014) 6 European Defence Matters, pp.20-22
One thing is certain: common European R&D should be managed in close cooperation with all actors concerned, namely the EU institutions, participating States, the defence industry (large companies as well as SME), and centres of excellence (public and private) mentioned above – whilst still ensuring that the participating States keep the necessary control.

It would also be preferable if non-EU European States (such as Norway, Switzerland, and in the future the UK) are closely associated with any common EU R&D efforts. As a matter of fact, after Brexit, the financial share of European defence R&D coming from European NATO-members will be higher than that of EU Member States. The role of NATO in the financing and management of European defence R&D should therefore be further investigated.

**Intellectual Property Rights (IPR) and Contractual Issues**

When discussing IPR, one should keep in mind two different aspects of IPR. The first is IPR ownership (especially of foreground information), the second is the licence or usage rights granted by the owner of the rights, which are usually granted by contract. The owner may grant either limited (e.g. usage of the information/technology only for one’s own operation and maintenance) or broad usage rights (e.g. right to use the information for developing a new product, to modify the information/technology, to integrate it in other information/technology, and/or to transfer the rights to third parties).

Usually, purely company-funded work is provided with limited user rights, but user-funded R&D implies full user rights, whereby the IPR on the results of R&D projects entirely paid through public funds either is owned by the client, or the client enjoys extensive user rights. The case is more complex for jointly-funded (partly through private, and partly from public funds) projects, and even more complex when the public funding is, at least in part, commonly financed, for instance through EU funds.

A general rule should be that every EU Member State (and other participating European States, if any) should be provided full user rights of the IPR on the results of R&D projects financed in part with EU funds. Ownership of such IPR could remain with the companies performing the project. Other studies take a much more industry-centric view, but those views seem to ignore the strategic importance of defence IPR for the funding public entities and of the common interest. In addition, limits should be imposed on the rights of defence companies to transfer the results of defence R&D projects outside the EU, even within their own industrial group.

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(23) See further B. Heuninckx, “Internationalisation of defence contracts: The complexities of collaboration”, in M. Audit & S. Schill (Eds.), *Transnational Law of Public Contracts* (Bruylant, 2016), pp.455-456


However, in this case, a mechanism or a compensation procedure must be put in place for companies prevented to take intellectual property outside the EU. A commitment to long term development and procurement programs building on the results of the R&D project could be one of the options.

Public procurement law gives European States and the EU much freedom in financing defence R&D and in awarding defence R&T contracts in the field of defence and security, especially in case of shared financing.\(^{(26)}\) This flexibility would allow for the systematic use of the pre-commercial procurement (PCP) approach whereby, within a phased R&D project, risk-benefit is shared between the public purchaser and the participating industries according to market condition and competition is retained up to the end of the project without financing commercial production (see Figure 3). This approach to R&D projects is used in Horizon 2020 programmes and would allow dealing with the IPR issues mentioned above by sharing the results of defence R&D projects, whilst at the same time enhancing competition in defence R&D.\(^{(27)}\)

![Figure 3 – Pre-commercial Procurement (PCP) (source: European Commission)](image)

**The Levers to cooperate more on R&D**

In order to understand the way in which R&D funding is used in the European defence market, it is instructive to review the market and the drivers which have been identified by that market, as well as the experience of specific countries within the market. The levers on R&D can be considered from a number of related perspectives as well as from the EU driving principle\(^{(28)}\) and the guidance which currently exists\(^{(29)}\).

\(^{(26)}\) Directive 2009/81/EC, Article 13(j) and Recitals 34 and 55, Article 28(2), and Article 13(c) and Recital 28, keeping in mind our comment above that Directive 2009/81/EC defines R&D as TRL1-6, namely our definition of R&T

\(^{(27)}\) See Communication from the Commission, Pre-commercial Procurement: Driving innovation to ensure sustainable high quality public services in Europe, COM(2007)799, 14/12/2007; Commission Staff Working Document, Example of a possible approach for procuring R&D services applying risk-benefit sharing at market conditions, i.e. pre-commercial procurement, SEC(2007)1668, 14/12/2007


Industry Perspective

Defence industries in Europe have formed lobbying groups in order to influence the political and financial decision makers. ASD Europe thus notes that the proposed investment funds in R&T are good news and that they "stand by to support". They also list the elements which should be considered: IPR, funding levels, technology ownership and cross-border engagement at all levels. They are keen to point out that R&D is not an end in itself, but provides a "lever", that of continuation of funding, which will attract industry. Whilst Industry is thus incentivised by longevity of investment, and conversion of R&D into production, it is also keen to take advantage of any tax or accounting rules applied to investment in R&D. Thus another lever becomes "tax rules", a general identifier primarily due to the complexity of the tax regime within Europe. However, specific relaxation of rules associated with dual-use investment is identified as a benefit. The EDA maintain communication with SME to encourage participation, but engagement has to hit a number of industrial perspectives in order to take the risk of generating proposals.

National Perspective

The current EU Member States, whilst having a common interests in defence and technology, have by design and history many differing methods of delivering. Smith notes particularly the difference between the UK and France in their approaches, which identify that the UK laissez-faire approach led to defence industry consolidation and internationalisation, whereas the dirigisme of France had a smoothing effect on the industrial base. In France particularly, Moura and Oudot have highlighted the role of SME in R&T, noting an annual investment of some €0.75 million per company per year, double that of non-defence companies. Thus a lever for R&D from a national perspective comes from the identification of appropriate technology and/ or capability area, and associated technology companies.

European states without a long history of defence technology engagement, or new to the EU, register at the low end of defence EU investment but seek the same capabilities, both in outcome and inward investment in new technology companies or manufacturing plants. Leverage for these stakeholders for investing in common R&D projects comes from idea of a juste retour as well as wider economic ambition. Leverage for industry comes from an incentive to seek wide collaboration within the EDTIB in order to win development contracts. This links directly to the "capability perspective" discussed in next the section below, and shows that national industrial strategy and capability perspectives merge to provide a powerful link to those technologies.

(32) R. Smith, The Economics of Defence in France and the UK (Birkbeck College, University of London, 2013)
(33) S. Moura & J-M. Oudot, Performances of the defense industrial base in France: the role of small and medium enterprises (Defence and Peace Economics, 2016), DOI: 10.1080/10242694.2016.1195574
(34) On juste retour, see B. Heuninckx, The Law of Collaborative Defence Procurement in the European Union (Cambridge University Press, 2016), Ch.3
and capabilities which are likely to draw interest from particular sectors, and where industry can collaborate to assure support.

**Capability Perspective**

Nations can cooperate on identifying threats, but threat-related policy decisions on capability is a direct result of national defence policy with differing results on focus for platforms and functionality. Nations also collaborate in different forums, e.g. EDA, OCCAR and NATO, which coordinate nation’s requirements depending on platform or project. There are also powerful national interests already in place which are directed to fulfil these requirements at system level. National industrial strategy on technology capability enhancement, however, can be a lever at sub-system and unit level as well as research into new "effect" areas. Where outcomes are less specific to platforms or projects, national cooperation on R&D in this area can be shown in recent EU funded research, which shows cooperative research into new effects as well as complex legal/air safety issues. The engagement of nations to assure the projects and outputs is considered essential by Denis Roger of the EDA. Thus nations both create leverage by being more closely involved, thereby encouraging industry to do likewise. It is instructive that these areas may not fit the industry perspective on "research into production" at this point, and the rules for delivery of the funded projects likewise may not reflect the industrial perspective on rights and property. The challenge therefore is to create enough volume in the areas of interest, in the technology companies, and the primes, to give the whole the momentum it requires to sustain both itself as an EDA Endeavour and industry as the employers, creators and maintainers of technology, platforms and capability. This impression of momentum is the greatest lever in generating interest, competition and innovation.

**Funding Perspective**

The proposal to create an R&D funding mechanism for defence in the EU re-invigorated the debate on methods of funding and their outcomes. Archibugi and Filippetti note the differing perspectives of public and private financing and their outcomes. Their 4-box "Boston" grid shows that public-to-private funding should encourage collaboration and sharing whilst also providing market share and leadership to the enterprise, and acting as an inducement to industry to match or increase their own funding. Thus a lever for EU funding becomes "the degree of collaboration and sharing" and is the prime motivation for the creation of the momentum of funding, innovation, outcome and repeat (crucially) which enables and economic and political success story.

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Conclusions and Recommendations

Proposed Governance

Cooperation in defence R&D should be European rather than limited to the EU (involving in particular the UK, but also smaller nations like Switzerland and Norway). Duplication between EU and NATO efforts and between civilian and military R&D should be avoided, and a close cooperation on defence R&D between all forums should be established, especially since European countries such as the UK are more NATO-minded, whilst other such as France are more EU-minded. Funding provided by the EU should not prevent the involvement of non-EU European (and possibly non-European) countries in order to avoid duplication of R&D projects. Synergies should be sought between military R&D and Horizon 2020 projects. For this purpose, the Commission would have a key role to play.

Likewise, it is important to have a link between the EU R&D initiatives (led by EDA or not) and any future OCCAR programme. Ideally, OCCAR should be granted some form of observer status in all EU-led R&D projects. In addition, the OCCAR global balance principle should be considered for EU-led R&D projects in order to ensure a flexible allocation of workshare. This would support the Member States requirement for a fair return and facilitate future integration of programmes within OCCAR, but also ensure a more efficient work sharing that a strict application of juste retour project-by-project.

A general rule should be that every EU Member State (and other participating European States, if any) should be provided full user rights of the IPR on the results of R&D projects financed in part with EU funds. Ownership of such IPR could remain with the companies performing the project. There are some doubts as to whether or not the EDA has the resource and experience necessary to manage the R&D funds that the EU could provide. However, this discussion is actually a false problem: the EDA capacity will primarily depend on the quality of the resources that EU Member States will provide it. In this sense, a failure of the EDA to manage EU defence R&D projects will in most cases be a failure of the EU Member States.

In any case, a coordinating structure should be put in place to make the necessary decisions related to European defence R&D. A lean model of management should be applied, relying on existing structures and processes and not creating new permanent institutional structures. For the day-to-day management of European R&D, a limited permanent staff (either within the EDA or the Commission) should be assigned to coordinate the efforts, but should rely on a pool of scientists from the identified centres of excellence that can be put together depending on the topic for a specific project.

(39) On the OCCAR global balance and other similar work-sharing principles such as the EDA global return and the NSPO balancing of production, see Heuninckx, The Law of Collaborative Defence Procurement, §§19.2, 20.2 and 21.2 respectively.
The priority at the European level should be given to projects that cannot be managed by a single nation on its own. Spending of money should be focussed on the best centres of excellence and the best and more necessary projects ("smart specialisation"). Decisions as to priorities should not be left to an EU institution or to the EU Member States, as the latter could try to prioritize their pet projects. An R&D investment board should therefore be created, manned by R&D expert at the strategic level on a rotational basis, so that the decisions (project launch, choice of centres of excellence, allocation of funds) can be as independent as possible from the Commission, from the EU Member States, and from commercial concerns. Those decisions can be prepared by the Commission or the EDA, but the decisions themselves should be left to this independent board.

In addition to the R&D Investment Board, an R&D Advisory Committee involving representatives of industry should be created. This Committee would advise the Board on the Commission’s and/or EDA proposals submitted to the Board, and would have to demonstrate complementarity of the EU project with the industry R&D efforts. Obviously, this would require the European industry to provide some visibility on their current and future R&D investments. In preparation of PCP projects, the R&D Advisory Committee should identify the technical issues that would require investment in R&D through such projects.

Other studies envision that the decision-making process for defence R&D projects should remain in the hand of the EU Member States and the European Commission, even though the necessity of inputs from external advisors is recognised. However, this "traditional" approach could lead to decisions that are skewed by domestic concerns such as industrial return, and would lead to the continuation of inefficiencies and duplications.

Finally, this governance structure should agree and keep updated a short-, medium- and long-term planning to identify what capacities and related R&D projects would be required in the future, and make this planning available to industry so that the latter can orient their future R&D investments. EU funding and centres of excellence would then aim to support the R&D efforts of industry in a complementary way. This complementary planning and implementation, in enough volume to maintain interest, employment, skills and development, is essential as a lever for the future of European investment and decision making, as well as capability delivery resulting from successful R&D. This planning should also be adequately coordinated centrally with the similar plans of the participating European States.

**Proposals for Centres of Excellence**

The number of defence R&D centres of excellence in Europe should remain limited. A first model (model n° 1) for a centre of excellence would be a "brick and mortar" centre acting in a specific area, to which European countries would participate in terms of funding and personnel in function of their priorities (similar to the NATO cyber centre in Estonia). Another possibility

(42) EU Institute for Security Studies, European Defence Research, §4.2
is to set-up virtual centres of excellence (model n°2) linking different universities, research centres and experts through internet tools. Those two models could be used concurrently in different domains. In any case, an increased knowledge sharing at the lower TRL in Europe is necessary because resources are limited and because of secrecy issues with the dissemination of knowledge in the defence field, and therefore, even though each centre of excellence should specialise in certain domains to ensure efficient use of resources, the results of their R&D should be shared with all centres of excellence and participating European States in a network fashion, in line with the openness principles of PCP. The Capability Technology Areas (CapTech) identified by the EDA(41) could constitute a starting point that would evolve into centers of excellence, but would require more funding, support and strengthening.

The identification and possible concentration and/or linking of centres of excellence should be performed centrally (for instance by the Commission or the EDA), and then approved by the R&D Investment Board with advice from industry within the R&D Advisory Committee. As mentioned above, an advanced analysis has to be performed to identify what technology would be needed in the future and how centres of excellence would be involved in the short-, medium- and long-term planning. Nevertheless, the centres of excellence should be agile and able to react quickly in function of new types of threats.

One could question if it should not be the market that decides which the centres of excellence are. There is indeed a risk in "forcing" the creation of centres of excellence centrally at the governmental level: the participating States could wish to apply some form of juste retour and such artificial network could be inefficient. To lower this risk, one could start from existing defence research institutes and university/research clusters and make them work together if they work in the same domains (as in model n°2), and, if appropriate, progressively integrate them (as in model n°1).

Funding of R&D should be given primarily to the centres of excellence, which can then select partners from industry to cooperate or complement public funding in order to speed-up the research tempo or enlarge this scope, rather than directly to the defence industry. A centre could cover more than one long term project. As mentioned above, use of the competitive X Prize method of funding should be envisioned.

Creating centres of excellence can also mitigate the risk that intellectual property and knowledge would be sold or moved outside Europe, because constant long term funding of new projects with or without private sector participation or cooperation allows the European States to retain control over human resources, IPR and knowledge. This would be a good trade-off and would provide long term benefit to the European taxpayers, without at the same time creating artificial trade barriers.

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(41) See https://www.eda.europa.eu/Aboutus/how-we-work/expert-teams/capability-technology-areas, accessed on 23/04/2017
Concentrated governance with focused funding and centres of excellence ("smart specialisation") would have a big impact on European defence research and would speed up the re-building and creation of new capabilities for European benefit. The proposed processes and structures should be put in place during the research preparatory period by year of 2021.

**Proposed Focus of the Funding**

The sharing of knowledge would probably be easier if cooperation is kept to lower levels of TRL. For higher TRL, if too many countries are involved in defining the specifications, the process could become too complex: two to five nations should agree on requirements for joint R&D projects, and the other could join the cooperation later.

Industry is often unwilling to invest in research that is not proven to be marketable, for instance a TRL1-3 project that in the end would not lead to a product that would sell on the market. Even though some large companies will fund research into those lower TRL, it will be with a view towards commercial production. The EU/government funding should therefore invest in the lower levels of TRL, especially in areas where commercial potential is not immediately evident, but from where breakthrough technology could emerge. Also, lower-levels TRL are typically what SME can concentrate on because SME would not have the production and self-funding capability to produce large quantities, so this strategy would contribute to the EU aim to support SME in the defence sector. For that purpose, reliance on the PCP approach, which provides a large incentive to the participation of SME in R&D projects, should be preferred.\(^{(42)}\) In line with the principles of PCP\(^{(43)}\), the agreement between the parties concerning IPR must ensure the availability of the results and information produced by the R&D project to the EU/Government, the contractors, and other public and private entities (either ownership or full rights of use, with adequate compensation).

The biggest need for EU/government investments seems to be with TRL4-6 (technology demonstration) because those TRL require a significant increase in funding (the so-called "valley of death"), as compared with TRL1-3, which can often be self-funded by SME (even though they should be helped to fund those lower-level TRL as well), and TRL7-9 are usually financed by larger primes because at those stages the technology and its commercial viability has been demonstrated. Again, this pattern is consistent with the use of the PCP approach, which is focussed on TRL1-6. The funding of some of those PCP projects could be based on the incentivized "X Prize" competitive approach used in the US for challenging short- to medium-term R&D projects aiming to bring about radical breakthroughs, whereby prizes are awarded by the sponsoring authority to the best solutions to an identified technical issue.\(^{(44)}\)

\(^{(42)}\) L. Bos, “Update on results from completed and ongoing FP7 and Horizon 2020 funded Pre-Commercial Procurements (PCPs)”, at https://ec.europa.eu/digital-single-market/en/news/results-eu-funded-pre-commercial-procurements, accessed on 06/05/2017, Slide 8: 71% of PCP contracts have been won by SME, compared to 29% average in public procurements across Europe
\(^{(43)}\) SEC(2007)1668, §4
\(^{(44)}\) See www.xprize.org, accessed on 17/05/2017
The PCP approach would define the procedure to be followed, whilst the X Prize approach would define how funding is provided. In order to mitigate losses to those who did not win a prize, a composite funding approach could be applied, whereby companies not winning prizes would see their losses compensated.

This means that common European defence R&D projects should focus primarily on TRL4-6, with a lower focus on TRL1-3 in support of SME self-funding. However, this will require a very deep coordination between industry (both SME and large companies), European centres of excellence, and EU/government funding to ensure real complementarity and avoid duplications. This approach is envisioned by the European Commission for EU funding (see Figure 4), but could be even further integrated on the basis of the suggestions made in this paper.

![Figure 4 – European Commission's View of EU Defence Funding (source: European Commission)](image)

**Human Resources and Technical Infrastructure Issues**

Today the main human resource issue in Europe is to maintain a volume of activity and expertise for defence R&D in lower TRL (1-4), as those R&D levels are currently not given sufficient funding and those TRL are too low to interest the defence industry because of the uncertainty of the commercial viability of the results. Indeed, if industry has no or little orders for military hardware, and if industry is left in the lead on defence R&D, training and expertise in specific military technology could disappear. Priority should therefore be given to maintain continuous European funding of R&D in lower-level TRL to be able to build and retain the necessary human resources to perform the R&D needed to meet future military challenges and threats. Another possibility to mitigate the risk of disappearing human resources is to develop a cooperative model whereby experts could be shared between universities, centres of excellence and private companies within Europe, and during some periods be paid by or through the EU/governments so that they remain active in their domain of expertise in centres of excellence or universities when there is no work in industry at the higher TRL levels.

Moreover, the defence industry must also participate in the organization of the next generation of specialists. Education and training in any form are indispensable. Therefore, the human resources departments of defence companies must be required to enhance tailor-made further development concepts for future specialists and to define, enable or even arrange further training measures.
Processes to compensate for lack of human resources and to rebuild lost and build new knowledge must be aligned or at least consistent with European overall research programmes and policies, in particular civil and dual-use R&D projects. This consistency at the European level has to be ensured by the governance structure proposed above.

Multi-discipline knowledge or projects should also be encouraged for the development of new human resources in the research sector. Nowadays research is at the same time more and more detailed and in-depth, but also more multi-discipline.

In addition, a part of the defence R&D funding could be allocated to sponsoring scholarships at top European universities for master’s degrees, doctorates and post-doctoral work in specific fields of interest for European defence and security.

As the technical infrastructure needed for R&D is very often specialized and highly expensive, as discussed above, it might be useful to share the use and costs of such infrastructure with universities and other research centres. Likewise, civil-military sharing of technical infrastructure should be increased both within and between European countries, but this could be a problem if the facility in question is specialized for defence R&D only. One solution could be to emphasize in particular cooperation with defence R&D centres of excellence in other European countries and/or defence industry. However, this approach depends highly on long-term relationships and common strategies to achieve.
Committee 2

What means EDTIB in order to reach the EU’s strategic autonomy?

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Executive summary

Searching for a new paradigm for defence armaments cooperation in Europe and under the current imminent geopolitical and economical contexts, in this paper Committee 2 looks at the risks and opportunities of maintaining a strong EDTIB to reach the EU's strategic autonomy.

As a first step, we will define our committee as "strategic autonomy" committee and develop its main drivers based on a set of assumptions, either on a more EU's autonomy approach or on a collaborative EU. Both approaches will indirectly reflect a very specific level of ambition resulting in the requirement of the relevant defence armaments cooperation conditions with their general risks and opportunities under the perspective of EU's collective defence efforts.

The second step will compare the current EDTIB with the above-mentioned approaches in the form of future-related scenarios. The main part of the paper will focus on developing the ends, ways and means to get there, considered from a wide variety of perspectives. With these base-lines, we will be reflecting relevant risks and opportunities and sketch some recommendations.

The third and final step will analyse the results and summarize the advantages and disadvantages for the approaches in order to reach the EU’s strategic autonomy taking into consideration the two scenarios.

After the last NATO summit and a Group of 7 meeting in Italy, Angela Merkel said: "The times in which we could rely fully on others – they are somewhat over". It looks like a huge shift in transatlantic relationships since the creation of NATO at the beginning of 1950's. President Trump reluctance to sustain this historical western alliance and Brexit will probably open the way to a closer cooperation between EU Member States.

It should be also underlined that the downgrade of transatlantic relations is also linked to a context of economic warfare. The rivalry between the United States and its European allies appear clearly in one of the famous Donald Trump tweets: "We have a MASSIVE trade deficit with Germany, plus they pay FAR LESS than they should on NATO & military. Very bad for US. This will change." It seems to be a veritable blackmail between economic dominance and military protection!

In such a context, building a strong EDTIB for reaching a strategic autonomy is a wise approach. The EDTIB is no longer sustainable on a strictly national basis and the EDTIB is greater than the sum of its national parts. This report is the fruit of enthusiastic discussions between EU convinced – but realistic – representatives of the defence sector. One of the main challenges of course, as we describe in the chapter "Strategic autonomy for the EU", is the political will. But EU has already strong military capabilities and good industrial basis, and as we show in the chapter "Risk assessment", EU MSs have already decided during the last European Council to follow the "EU’s collaborative" approach. Which is why, we recommend a few actions to preserve and reinforce the EDTIB:

✓ Instead of trying to control the capabilities within the EDTIB, EU should concentrate on identifying lack in capabilities and finding a model on how to finance new company constellations that should develop capabilities that EU lack today. This has also been discussed in various terms in the European Defence Action Plan.
✓ It will also be very important to invest in the technological edge in order to maintain a gap with our potential enemies, but also to be close to NATO/US standard. This investment in technology will also give the opportunity to keep the best scientific "brains" in the defence sector.

✓ EU should also continue to encourage the competition between companies in order to have the best value for money, but to have competitive solutions for foreign customers.

✓ EU will also have to build stronger industrial leaders, like it was done with Airbus in the civilian aircraft industry. The objective is not to create monopolistic situations, but to give to our industry more capabilities to invest and more means to fight the competition in a context of economic warfare.

✓ Finally, EU will have to implement structure to conduct the development of this stronger EDTIB. EDA and OCCAR have paved the way of this trend, but this has to be encouraged without duplicating existing MS structures.
Committee 2 report on "What means EDTIB in order to reach the EU's strategic autonomy?" represents, first of all, the personal perspective of ten citizens of the EU and partner countries, who work/are involved in defence industry or governmental structures which deal with defence equipment procurement, defence planning, defence programmes management or elaborating requirements for defence equipment and materials. This document does not represent an official point of view on this matter of the Institut des Hautes Études de Défense Nationale, of the states represented in this committee or of the EU and its institutions.

This document is not a scientific one, being instead a reflection on the challenges of our world which impact the EU, the Member States and its partner countries, challenges related to foreign policy, defence, and defence industry. Our subtheme is very actual; it has been discussed a lot in the last past ten years, and is very deeply and strongly related to the near future of the EU, its Member States, and EU citizens. The European Council’s last meeting in June 2017 pointed clearly in this direction too, when it was decided to further continue to investigate the suggestions of the European Defence Action Plan.

Recovering from the tragedy of two world wars, the EU was created over sixty years ago in order to rebuild Europe from its ashes and to bond together European peoples. The troubled past has given way to seven decades of peace. The enlarged Union has 500 million citizens who live in freedom in one of the world’s most prosperous economies. "The images of battles in trenches and fields in Verdun, or of a continent separated by the Iron Curtain and the Berlin Wall, have been replaced by a Union standing out as a beacon of peace and stability"[1]. The EU is the place defined by a unique diversity of cultures, ideas and traditions in a Union covering four million square kilometres, where Europeans can travel, study and work across national borders. "The EU is the place where the rule of law has replaced the rule of the iron fist"[2].

The construction of European unity has been and still is a bold, far-sighted endeavour. European unity started as the dream of a few, it became the hope of the many[3]. The EU’s fundamental values are respect for human dignity and human rights, freedom, democracy, equality and the rule of law. These values are common to the Member States in a society in which pluralism, non-discrimination, tolerance, justice, solidarity and equality prevail[4]. These values unite or shall unite all the Member States – no country that does not recognise these values can belong to the Union. The main goal of the EU is to defend these values in Europe and promote peace and the wellbeing of the citizens.

We must be honest and recognize that the EU cannot accomplish this main goal, stated in The Treaty on the European Union, without a strong and common foreign and defence policy, without strong, flexible, and coherent military capabilities, and without a strong EDTIB. In this document, we have tried to present our view on what the EU, the Member States, the defence companies/industry should take into account and how they should act to positively impact

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EDTIB to achieve the EU’s main goal. Committee 2 has aimed to address some aspects of this theme in an “out of the box approach”.

In our opinion, the necessity for the EU’s strategic autonomy and its subsequent component – common security and defence policy, common European military capabilities, strong European defence industrial capabilities e.g., was correctly and deeply understood in 1950, when Jean Monnet, then General Commissioner of the French National Planning Board, expressed his will to organise European defence on a supranational basis, an initiative inspired by the French foreign minister Robert Schuman’s plan for establishing the European Coal and Steel Community (ECSC) that would eventually come into effect in 1952.

The proposal for what was known as the European Defence Community (EDC) was submitted by the French Prime Minister René Pleven to the National Assembly in October 1950. It called for the creation of a European Army to be placed under supranational authority and to be funded by a common budget. The ambitious idea was supported by most Western countries and the EDC Treaty was signed by Belgium, France, Germany, Italy, Luxembourg, and the Netherlands in May 1952, and even by the United Kingdom in April 1954, although sceptical at first, it eventually gave its agreement to the initiative. However, in August 1954, the French National Assembly rejected the Treaty, refusing even to discuss the matter, and the concept of the European Defence Community was buried. Over the next decades, European integration in defence would take place primarily in the framework of NATO.

What can be learnt or should be learnt from this, in our opinion, is that a problem postponed is a problem not solved, and after sixty-three years we have a similar scenario. Maybe now is the time to come up with a different answer to this question. And it is useful to keep in mind that Dwight D. Eisenhower, the NATO’s Supreme Allied Commander Europe (SACEUR) at that time, supported the EDC project as an effective way to maximise European military potential. Searching for a new paradigm for defence armaments cooperation in Europe and under the current imminent geopolitical and economical contexts, in this paper Committee 2 looks at the risks and opportunities of maintaining a strong EDTIB to reach EU’s strategic autonomy.

As a first step, we will define our committee as the “strategic autonomy” committee and develop its main drivers based on a set of assumptions, either on a more EU’s autonomy approach or on a collaborative EU. Both approaches will indirectly reflect a very specific level of ambition resulting in the requirement of the relevant defence armaments cooperation conditions with their general risks and opportunities under the perspective of EU’s collective defence efforts. The second step will compare the current EDTIB with the above-mentioned approaches in the form of future-related scenarios. The main part of the paper will focus on developing the ends, ways and means to get there, considered from a wide variety of perspectives. With these baselines, we will be reflecting relevant risks and opportunities and sketch some recommendations. The third and final step will analyse the results and summarize the advantages and disadvantages for the approaches in order to reach the EU’s strategic autonomy taking into consideration the two scenarios.
Strategic autonomy of the EU

General aspects related to the strategic autonomy of the EU

The EU is strengthening its security and defence capacities. In June 2016 Mrs. Federica Mogherini, the EU’s High Representative for Foreign Affairs and Security Policy, presented the Global Strategy for the European Union to the twenty-eight political leaders. Released straight after the British referendum, it calls for a stronger Europe to act as a security provider in a more contested global scenario. The Strategy’s security and defence plan is based on three elements. The first is defining a comprehensive level of ambition, integrating internal and external security. The second is to strengthen the strategic partnership between the EU and NATO. Forty proposals to deepen cooperation in seven areas will be worked on. The third element, and most important for this SERA-paper, is to support the industrial basis for European Defence. As a follow up, on November 30, the European Commission adopted the European Defence Action Plan (EDAP). This supports defence research, invests in the whole European Defence supply chain, makes a proposal for a European Defence Fund, and improve the Single Market for defence. The Global Strategy doesn’t entail the creation of an “EU Army” (nor does NATO have its own forces), nor imply a military alliance, which is a task for NATO and its members. However, as Mrs. Mogherini states in the foreword: “The Strategy nurtures the ambition of strategic autonomy for the European Union", while observing "none of our countries has the strength nor the resources to address these threats and seize the opportunities of our time alone."

Strategic autonomy

The question presents itself what complete "strategic autonomy" is, and what is needed to reach it. In our perception, strategic autonomy is "the ability, for a single MS or for the EU, if necessary, to decide and act independently from others at the highest political and military level ". Elements that play a significant role in it, or are a prerequisite for the ambition to be turned into full reality are:

✓ Common (security and defence) policy.
Without such a policy, there is no unity of thought and subsequent (political or military) action.

✓ Common decision making process.
Countries should agree to a decision-making process, which is used to underline and implement the common policy.

✓ Common vital interests and values ("political will").
Without common vital interests and shared values, effective diplomatic, economic or military action is impossible. Discussions will erupt at the least suitable moment or countries will refrain from action if counted upon.

✓ Common or deeply integrated economies/common funding mechanisms
Only with an economic policy supporting the security and defence policy it is possible to create autonomy.
✓ Access to (natural) resources
Dependency on other countries and thus not a guaranteed uninterrupted access to (natural) resources prevents strategic autonomy.

✓ Capable instruments of military power
The old adagio "speak softly, but carry a big stick" still holds. One of the instruments of power is the military. Well-equipped, modern and interoperable military forces back up a security and defence policy.

With an eye to current sensitivities, the Global Strategy now states that "full spectrum defence capabilities are necessary to respond to external crises, build our partners capacities, and to guarantee Europe’s safety. Member States remain sovereign in their defence decisions: nevertheless, to acquire and maintain many of these capabilities, defence cooperation must become the norm."

European Defence Technological and Industrial Base (EDTIB)

In order to be able to field these full spectrum forces, a solid and independent EDTIB must be grown and maintained. The Global Strategy states: "Member States need the technological and industrial means to acquire and sustain those capabilities which underpin their ability to act autonomously. While defence policy and spending remain national prerogatives, no Member State can afford to do this individually: this requires a concerted and cooperative effort. Deeper defence cooperation engenders interoperability, effectiveness, efficiency and trust: it increases the output of defence spending. Developing and maintaining defence capabilities requires both investments and optimising the use of national resources through deeper cooperation."

It also points a way forward: "The EU will systematically encourage defence cooperation and strive to create a solid European defence industry, which is critical for Europe’s autonomy of decision and action."

Strategic autonomy – from what perspective?

Member State perspective (MS)

If we choose the perspective of a single EU Member State (MS) it means the MS sovereignly can decide on how to spend its money, defend its sovereignty and how to value its DTIB (Defence Technology Industrial Base). Each MS has different SoS requirements depending on its security situation, national defence policy, industrial base etc. This perspective could however lead to sub optimization from an EU point of view, for example leading to multiple companies covering the same technology capability, non-harmonization, non-interoperability, non-collaboration. Thus, this is a risk for exposure to economic warfare means.

In one scenario, the perspective above could lead to MS developing its own DTIB to a rather high extent, which of course is not cost effective, but could ensure a higher strategic autonomy for the single MS. However, from a defence perspective this will always result in strategic
weakness for that MS, since a single MS never could afford to be self-sufficient when it comes to a complete set of capabilities.

In another scenario, a single MS could realise that it cannot afford to maintain its own full capability DTIB and thus is more interested in collaboration and also more dependent on other countries industrial capabilities, as was mentioned above\(^5\).

If the MSs should not be autonomous as described above, one alternative could be to form EU as a federation – which is the basic assumption for the EU standalone strategic approach. Since that is not the current situation (or the future plan) the more common choice of a single MS is to collaborate, which is also stated in the Global strategy: "Member States remain sovereign in their defence decisions: nevertheless, to acquire and maintain many of these capabilities, defence cooperation must become the norm." The collaboration can be with one or many other MSs or, for example, with and within NATO. The latter (if widely expanded) also, for the single MS, opens up to a common NATO DTIB rather than an EDTIB.

Regardless of what type of collaboration is chosen, the EDTIB is no longer sustainable on a strictly national basis. EDTIB is something more than the sum of its national parts. European nations cannot determine their equipment requirements on separate national bases, develop them through separate national Research and Development effort, and achieve them through separate national procurements. This way is no longer economically, military and operationally sustainable in global world market and also unacceptable from the military point of view.

The more dependent the economy is (as regards collaboration and business) the more important it is for the obstacles that makes it more difficult doing business and collaborate to be mitigated. Examples of such obstacles are regulations like ITAR (can hinder export and reexport), customs, intra community transfer regulations etc.

European Union perspective

If we instead of choosing the perspective of a single MS take the perspective of strategic autonomy for the entire EU, this presupposes that the EU has a common:

- EDTIB for the capabilities that are needed. This is also pointed out in the Global Strategy’s Security and Defence Plan - support the industrial basis for European Defence
- security and defence policy. Without such a policy, there is no unity of thought and subsequent (political or military) action.
- defence force and thus a common defence spending/budget is also needed.

What would this mean to the sovereign single MS? Could a strategic autonomy for EU be reached with sovereign Member States still existing?

In the Global Strategy it is stated that it nurtures the ambition of strategic autonomy for the European Union and that no MS has the strength nor the resources to address the threats and seize the opportunities alone.

Cooperation is the alternative to reach the desired capabilities without having the EU centrally to decide which country or company should be supplier of certain capabilities. One way of
finding the areas for this cooperation could be to let EDA lead the work. In this scenario the MoDs of the EU countries should identify their needs and these needs should then be known to the EDTIB. This should be achieved by prioritizing capability needs (middle and long term), identifying key technologies (for example air and space, command and control, land and ocean forces), identifying key industrial capacities, assessing existing and planned capabilities, identifying European military capability shortfalls, and agreeing on priority actions. This procedure was actually agreed upon on 22\textsuperscript{th} June 2017 by the European Council.

How come that the collaboration so far is not as common as we judge it could be and should be? Probably part of the answer can be found in the single MS’s sovereignty in addition to the assumption that there is a lack of trust towards other countries’ promises. Here is also a risk that economic warfare activities can exist – for example if two or more parties are collaborating and thus growing more dependent of each other and then, all of a sudden, the collaboration is refused for one of the parties. This risk creates distrust between MS or parties (such as companies).

This of course makes the way towards strategic autonomy for the EU with a common EU defence force and consolidated EDTIB harder. And, as the EU Ministers once stated “The concept of a truly European DTIB will not be realized in practice unless the Member States can be confident in increasing mutual dependence, for supply of defence goods and services is matched by increasing mutual assurance of that supply”.

If the union should decide that there are too many companies competing with each other within the current EDTIB and would like to change this, two questions arise:

1. Who is to decide which companies and countries shall specialise in certain capabilities if this is not agreed upon within the EDA as suggested above?
2. How to handle the financial issues (and consequences) between all countries if the EDTIB is to be more controlled and consolidated?

Can Europe really be controlled as regards EDTIB? A controlled economy contains customs and ineffective companies on the one hand, but on the other there could be a control through which Europe can have access to all necessary capabilities that are desired. But who is to decide what company or country has the comparative advantages/capabilities relatively to other companies/countries? This controlled economy would, however, have more harmonized demands and the supply would be a consequence of which market actors were decided to specialise in certain capabilities.

In the scenario above, what is the line to take to the USA? Would it be interesting to close the European market for American companies?

If we on the other hand decide to have a free and global market we will probably have more effective companies, competition and a downward pressure on prices. However, there is a risk that the necessary capabilities could not be supplied within Europe and this could be a threat in reaching the strategic autonomy.
We will have to realize that EU, independent of which of the two extreme market alternatives briefly discussed above, is dependent on defence materiel capabilities from outside the EDEM (European Defence Equipment Market). EU is not self-sufficient and the question is if that is ever possible? As regards the supply chain, there will probably always be direct or indirect dependencies from outside the EDEM.

Instead of trying to control the capabilities within the EDTIB, EU should concentrate on identifying lack in capabilities and find a model on how to fund/finance new company constellations (new companies, joint ventures between existing companies or a combination of both) that could develop the capabilities that EU lack today.

EU also has to discuss how to procure from the EDEM. If we keep the MS perspective the procurement directives should be revised in order to make the regulations easier and less bureaucratic. Should OCCAR be the procuring agency for whole Europe once the strategic autonomy is coming nearer? How to avoid enormous bureaucracies/administrations within the EU? Probably there are many more questions that have to be asked and answered when forming the new collaborative Europe and EDTIB. It is extremely important for the collaborative Europe not to become a political buzz word only, but also a practically feasible project in order to, with the MS’s reliance, reach a strategic autonomy for EU with a strong and competitive EDTIB.

**Having a strong EDTIB**

**What means EDTIB now?**

**The EDTIB concept evolution and aspects of EU’s policies**

The concept of the European Defence Technological and Industrial Base (EDTIB) was used for the first time in 2006 – 2007\(^6\). The concept was not defined yet in the literature and even today does not have an official definition to be assigned to. The EDTIB concept was focused on the desired outcome – better coordinated, less duplicative defence landscape, able to ensure the right military capabilities for Europe.

From 2007 to 2017 various documents/plans/strategies, regarding the "desirable" EDTIB and how to get there, have been elaborated especially at EU level. We mention, especially, the Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions – Towards a more competitive and efficient defence and security sector, dated July 24, 2013, and the Communication from the Commission to the European Parliament, the European Council, the Council, the European

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Related to EDTIB, the last Communication outlines good radiography of the existing state. So, if Europe is the world’s second largest military spender, it still lags behind the US and suffers from inefficiency in spending due to duplications, a lack of interoperability and technological gaps. With defence budgets in Europe shrinking in recent years, while other global actors have been upgrading their defence sectors, and without a sustained investment in defence, the European industry risks lacking the technological ability to build the next generation of critical defence capabilities, what will affect the strategic autonomy of the Union and its ability to act as a security provider.

The EU-NATO Joint Declaration is referenced with great importance in this Defence Plan, the same as the strong necessity to ensure the development of key capabilities necessary for the security of the Union and its citizens in a way complementary with NATO. The reference can be linked to the 8 of July 2016 moment, when the president of the European Council, the president of the European Commission and the Secretary General of North Atlantic Organization signed the Joint Declaration.

Current characteristics of the EDTIB

In the research activity that Committee 2 made in order to draft radiography of the current characteristics of the EDTIB, we identified the TNO report: Development of a European Defence Technological and Industrial Base, European Commission, DG Enterprise and Industry, 2009(7), a very good and substantial analyse of the topic. Committee 2 has tried to present its view, starting with the findings and conclusions of this report.

The report presents the defence industry as widely and unevenly spread across the EU 27. It includes many facilities that may be qualified as Centres of Excellence in R&T, but also includes redundant capacities and non-competitive facilities. The EDTIB is considered a conglomerate of subindustries. Civilian companies may constitute a vital part of the supply chain without being fully aware of their role.

The report analysed the structure of EDTIB using three basic elements to describe an optimally functioning European Defence Equipment Market (EDEM):

✓ capabilities (the way the EDTIB is capable to deliver and sustain key military capabilities, in the short term as well as in the long term, in order to maintain the necessary levels of European and national operational sovereignty);
✓ competence (the EDTIB should be able to develop new technologies and bring innovation, in close cooperation with other R&D organisations – for example academia);

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competitiveness (the EDTIB must be competitive/cost-efficient in a global sense, being able to export and to attract cooperation with European SMEs and non-European partners).

The report presents an original contribution by focusing on sectors which comprise the EDTIB, the air, land and sea, each sector being assessed in terms of capabilities, competences and competitiveness.

The aerospace sector has the capability to deliver key military capabilities, provide complex solutions, upgrade platforms and sustain national sovereignty.

The land equipment sector is considered in the report in complete contrast to aerospace, being smaller, less technically-progressive and lacking European collaborative programmes.

The naval sector is characterized by its large number of relatively small firms, excess capacity and lack of European collaborative programmes.

As overall conclusions, the report states that at the EU level, the Member States have a range of defence industries which have various degrees of capability, competence and competitiveness which provide the basis for an EDTIB.

The understanding of the Committee 2 is that the EDTIB is mostly a sum of national defence industries. Defence industry in the Western part of Europe is well placed technologically and organizationally to develop and operate almost all military systems and installations to high quality standards. It can be accepted that the defence industry has strong and deep positions/patterns in the LOI countries, despite duplication, excess capacity, the lack of collective defence R&D efforts, the “appetite” for national solutions based on Article 346 of the Treaty on the Functioning of the European Union.

The impact of the EU policies and the follow-up actions have been limited and focused mostly on soft, political measures and recommendations, not binding for the governments.

The future Brexit will massively impact the EDTIB. Now, there cannot be done a truthful assessment of the dimension of this impact, if the conditions of the “divorce” are unknown. We can say that the nature of this impact will be profoundly negative, the UK defence industry being one the powerful players, with a long tradition and very good results, even in collaborative programmes.

Meanwhile, there is a consistent gap between the Western part of Europe and the Central and Eastern European Member States – CEE MSs, which would strongly impact the overall integrated defence of EU MSs in crises or war situations. Not even in one of the three sectors (air, land, see) we couldn’t identify a Central or Eastern European firm as prime contractor or tier 1 contractor.
In December 2013, the European Council held a thematic debate on defence, when there was highlighted the need for "a more integrated, sustainable, innovative and competitive defence and technological base (EDTIB) to develop and sustain defence capabilities"\(^{(8)}\) and stressed the need to have a balanced defence industry in Europe\(^{(9)}\).

In the document Towards balanced defence industry in Europe: Main specificities of Central and Eastern European defence industries\(^{(10)}\), elaborated at EU level, the Baltic group (Estonia, Latvia and Lithuania) is represented mostly with maintenance, repair and overhaul facilities and components suppliers, the Visegrad Group (Czech Republic, Hungary, Poland and Slovakia) with a relatively well-developed technological and industrial defence base, and the remaining countries (Bulgaria, Croatia, Romania, and Slovenia) somewhere in the middle, Poland being the only country from the region which has the ambition to play a leading role in European defence matters. In other words, the CEE defence industries are very diverse and their power relatively low.

The differences between Western European countries and CEE countries related to defence industry and the implication of such over military forces can be analysed according to their defence industry capabilities, economy, policy and culture.

Defence Industry Capabilities

CEE countries have fewer capabilities compared to Western European countries. State owned MRO capabilities are used for logistics of armaments. Low cost, high quality, skilled and qualified labours are the strong side of the manufacturing capabilities which are mostly owned by the private sector. High quality science and engineering accumulation are the backbone of the state-owned R&D institutes. In terms of armaments trade which is held by the private sector, the new products are at the sub-system and component level. There is not any initiative to develop new platform and system-level products. The products in the inventory are the upgraded versions of the legacy platforms.

Economy

Due to the economic problems in Europe, defence budgets are declined in Western Europe in the last decade that forced the defence sector to cut back the spending, to attempt cooperation and defence industry to look at other civilian markets. The nations reducing budgets and shrinking defence forces imposed defence companies to put on multinational programs. However, due to the needs of new century, the development of the new sophisticated platforms has over budget the programs and does not ensure the necessary benefit in expected savings.

\(^{(8)}\) European Council, 19/20 December 2013, Conclusions.
\(^{(9)}\) Ibid.
\(^{(10)}\) Vilem Kolin, Towards balanced defence industry in Europe: Main specificities of Central and Eastern European defence industries, Institut de Relations Internationales et stratégiques, March 2015
In CEE countries (except Bulgaria, Poland and Romania) defence industries are private and well-integrated into the rest of the economy. State-owned defence industries are mostly developed and maintained by offset agreements.

Policy

In Western European countries, the defence sector has a tangible effect on the political agendas of the governments. The production and sales of the military equipment is very important to keep the defence sector alive. Defence sector occupies a considerable number of labours in defence sector which affects the employment policies of the government. The procurement policy of the nations is well defined and coherent within the overall defence strategic framework. The cooperation among countries is encouraged by the governments.

The main difference between the CEE and the Western European countries regarding the defence strategic perception is that it is not homogenous. Defence industry plans and policies which include the international cooperation and export have little systematic and continuous applications. For the reason that political strategies are not affected from the defence programs, no firm understanding of the specifics of the defence market exists. The governments have limited involvement in the discussion about the future of the EDTIB and do not put any pressure to significantly realize this engagement.

Culture

The culture of co-operation in Western European countries is well established and internalized by the defence industries. The defence market has a vision and ambition to work all over the world with the rules of free market. The R&D and procurement rules are regularly set by the authorities and are of benefit for the companies. The dialogue of defence companies with the international organizations and institutions (EDA, NATO) is properly structured helping to improve business cases.

On the other hand, the culture of co-operation in the CEE countries is very scarce. The governmental vision about the capability building, procurement rules and R&D incentives is not adequate to assist the relation with industry. The rules and procedures of the procurement and R&D are too complex and rigid that companies hesitate to cooperate with the government. The understanding of the frameworks, tools and processes of international cooperation and international organizations are very limited and do not give chance to internal defence market to build international relations. The defence sector has limited professional experience and foreign language knowledge at program management and decision making level.

In conclusion, we would say that the CEE MSs don’t have the substance to shape the discussion about the EDTIB, about a balanced EDTIB across Europe, or to provide an example of a successful important collaborative programme, due to obstacles presented. Very often a CEE MS pursues linking with western actors rather than other regional players.
In the medium and long term frame, these barriers must be addressed by MSs and the EU institutions. The goal to have a balanced EDTIB across Europe we would say is crucial, due to military operational reasons and strategic military motivation, and the necessity to manage the social, economic and political implications in a European perspective rather than a national one. If discussion goes in the same direction (one country’s "local" defence interest, strongly linked with economic, social and political motivation: number of jobs, the development of the domestic industry, the development of R&D domestic sector, the satisfaction of the electors etc.), we would say that we talk about strengthening the national defence and technological industrial base of the LOI countries rather than strengthening a truly European DTIB.

Priorities according to EDA

The core role of the European Defence Agency (EDA) is to help EU governments attain their defence objectives by outlining the efficiency gains that could be a result of doing things together. All MSs have different security and defence policy goals. Also EU does not see itself as a prime military power and prefers to seek foreign (and) security policy benefits by using "soft-power" approaches.

The maintenance of a strong EDTIB is a fundamental underpinning of the European Security and Defence Policy. EDTIB supplies the bulk of the equipment and systems for European Armed Forces. It assures us that they have the best technology, which guarantees that we can operate with appropriate independence. EDTIB also ensures valuable economic assets, major source jobs; export and technological advance which helps maintain public support for defence and EU citizens. EU needs to be a reliable security provider for its partners and at the same time protecting its citizens. In order to achieve these goals, defence can no longer be viewed only from the national perspective.

Support from EU countries and investment have declined together with defence expenditure. At the same time, the costs and complexity of defence systems grow. Competition in overseas markets has become more intense (from USA, China, India, Russia, Israel).

EDTIB is no longer sustainable on a strictly national basis. EDTIB should be something more than the sum of its national parts. European nations cannot determine their equipment requirements on separate national bases, develop them through separate national Research and Development effort, and realize them through separate national procurements. This way is no longer economically, military and operationally sustainable on the global world market and also unacceptable from the military point of view.

EU needs one institution which will cover and coordinate these requirements, clarify EU priorities, consolidate EU demands, ensure cooperation within EU and also outside of EU, keep investment in an appropriate amount in Research and Development, take care of EU education institutions, ensure competition in overseas market and also cooperate with EDTIB in overseas competitions. There should be room within the EDA for beginning the collaboration process and for EU nations (governments) to identify similar needs to achieve common capabilities.
After such a process, EU nations within EDA can develop and optimize an investment plan for Research and technology to procurement. The EDTIB also needs to be more integrated, less duplicative and more independent.

**Key actions for EU nations**

Clarifying priorities: MoDs of EU MSs should identify their needs and EDTIB should know these needs. This should be done by prioritizing capability needs (middle and long term), identifying key technologies (air space, air, land and ocean forces), identifying key industrial capacities, assessing the existing and planned capabilities, identifying (of) European military capability shortfalls, and achieving agreement on priority actions.

Consolidating demands: MoDs of EU MSs should adjust their individual defence programs and demands and together through one European procurement agency find out collaborative option for required systems. This should apply not just to new equipment developments, but to common off-the-shelf purchases, shared programs to upgrade existing equipment and also logistics support.

Pooling and Sharing: At this time, more than ever, EU nations need to work more closely together, EDA covers many pooling and sharing initiatives (Air-to-Air refuelling, Helicopter training, C-27J Spartan pooled and maintenance training, European Air Transport Fleet – EATF, Single European Sky – SESAR, maritime surveillance, SATCOM, materiel standardization). Pooling and Sharing can cover the full spectrum of capability development from the identification and harmonization of military requirements to through-life management, support, certification and standardization with the objective of supporting cooperative efforts of EU members to develop needed capabilities. But this system relies on political will and commitment, cost-effectiveness, flexibility, usability, sustainable industrial capabilities and technological non-dependence.

EDA is fully competent to cover Clarifying priorities and Consolidating demands of EU nations (MoDs) on medium and long term periods.

Increasing investments: Inadequate investment can harm EDTIB. Defence spending cannot benefit only from defence spending but some sums from the defence budget should be accommodated for Research, technology, development and there should also be included educational institutions. EDA has a motto "Spend more, spend better and spend more together on Defence Research and Technology". EU members should be able to allocate the necessary investment to support the development of future capabilities, including Research and Technology, taking advantages of European policies, regulations, standards and certification processes.

EU lacks a kind of "Government to Government" sales. (Foreign Military Sales in USA, in Russia there are also government owned corporations which cover sales of military materiel to other countries, also Chinese sales are supported by government, and thus the provided materiel is a kind of "cheaper than" Direct Commercial Sales). EDA can fulfil this niche.
Ensuring Security of Supply: Security of Supply is important both for the realization and strengthening of the EDTIB, and for the functioning of the European Defence Equipment Market (EDEM). Security of Supply underpins successful collaboration between EU countries (MoDs). Each EU nation has different Security of Supply needs and requirement, depending on their security situation, national defence policy, industrial base and many other factors. This adds to the complexity and feasibility of finding one solution that will fit all. In 2007, Defence Ministers state that "The concept of a truly European DTIB will not be realized in practice unless the Member States can be confident in increasing mutual dependence, for supply of defence goods and services is matched by increasing mutual assurance of that supply". EDA’s ultimate aim is the achievement of an adequate level of confidence in Security of Supply across Europe, including long term assurance of sources of key technologies and willingness of partner governments to facilitate supply.

There are issues that can improve Security of Supply amongst EU MSs:

- Enhancing mutual support and building of trust and confidence between MSs and within the overall European defence supply chain.
- Supporting cross-border contracting and cooperation between MSs.
- Strengthening EDTIB by developing, maintaining and ensuring access to key European industrial capabilities and critical defence technologies whilst seeking genuine European solutions for the development of future defence capabilities and promoting cross-border efficient industrial cooperation and ensure continuity of cross-border supply chains.

Enforce competition & cooperation: Strong EDTIB requires governments to work together. Current restrictions on intra-EU transfer of goods, services and skills are a major obstacle to the achievement of competition and cooperation. Other obstacle is that many EU Member states require their defence imports to be "offset / industrial cooperation" by compensatory purchases or investments. Competition should be a tool for providing better value to the customer and encouraging the evolution of the EDTIB. Cooperation may offer a better approach to the same ends. Governments should also be responsible for initiating cooperative efforts with healthy and realistic shared requirements. Another way is to focus on cooperative development of new equipment, collaborating on in-service support or upgrades of existing systems.

**The context of economic warfare**

**The pressure other countries can exert upon EDTIB**

Although there is not a satisfactory definition of economic warfare that exists in the literature, the best definition is made by Mr Robert Loring Allen as "Economic warfare is defined as the conscious attempt to enhance the relative economic, military and political position of a country through foreign economic relations".
Instead of using direct military power, countries use their economic power in order to reach their targets especially after the Second World War. The countries which have economic power use their power to subjugate the countries that they have political and military conflicts. On the other hand, economic warfare is not a method just used in the conflicts, but it is consciously managed at the state level to acquire and deprive the resources of the other countries.

In this context, the future of the EDTIB and strategic autonomy of EU could be affected by the countries that have economic power. These countries would enforce the market in order to reach their goals by means of economic warfare. In this respect, the EU countries need a common defence policy to support a strong EDTIB in order to develop and maintain a technological superiority against any nation within the world.

The future of a strong EDTIB can be achieved if the internal and external factors can be controlled. The internal factors arisen from the defence politics of European countries can be solved within European community. This solution will not be easy since all the countries have its own political ambition and market derivers. The supply and demand balance is different for each country. However, European common future and culture may convince and motivate the countries to work together for a strong EDTIB.

The external factors are driven by the countries outside of Europe. The forecast of global political atmosphere helps us to define the countries which can exert pressure to the future of the strong EDTIB.

The military spending of countries for the year 2016, which has been published by SIPRI, May 2017, presents that global military spending in 2016 was $1.69 trillion. Military spending is not only money spent on weapons; it includes spending on wages, pensions, equipment, research and development. The 10 countries, USA, China, Russia, Saudi Arabia, India, France, UK, Japan, Germany and South Korea, with the highest military spending accounted for nearly 73% of this total. US military spending in 2016 was $611 billion – nearly 3 times as much as China’s military spending, which was the second highest in 2016 at $215 billion. US military spending is larger than the next 8 biggest military spenders combined together. Russia surpassed Saudi Arabia to be the world’s third highest military spender in 2016, due to a sudden decrease in Saudi military spending due to decrease in the oil prices in 2016. According to this global picture of the top defence industry spenders of the world, Russia and China could be the countries that can exert pressure to the EDTIB’s future. India is also in the top 10 list however their spending is generally on military modernization and exported armaments.

Not only has the spending of Russia and China made them the potential threat for EDTIB, their regime, strong defence culture and base, continuous political ambitions and improving economy and export market are the factors that strengthen their hands.

Russia’s military spending in 2016 was $69.2 billion, an increase of 87% since 2007. Russia has used its increased military spending to modernize its armed forces due to Ukrainian crises with NATO. Russia has a huge capacity in design, manufacture and logistics serving to land,
naval, air and space forces. Their export capacity is one of the biggest on the world, selling to Asia, Africa and Middle East. Although the technology and design are not as good as westernized weapons, their equipment is cheaper than western armaments and effective in operations.

China’s military spending in 2016 was $215 billion, an increase of 230% since 2007. In the last decade, expanding defence budget has enabled China to carry out military reforms by refining the numbers of its military and improving the quality of technology, weapon systems and training. China’s defence-industrial sector is being transformed by reforms introduced in the interest of enhancing its competitiveness and capacity to meet the conventional arms requirements. China’s defence-industrial base is becoming more decentralised, with increasing scope for local state-owned enterprises. The privately-owned enterprises contribute to R&D and production.

Emerging technologies and industrial bases in China and Russia are expected to be dominating the defence industry for the next decades. The political ambitions and export market growth force these countries willing to increase the military funds every year. These funds help defence market to develop better technologies and products to the field. Cheaper work force helps these countries to produce cheaper products and to find easier customers in the export market.

Although Russia and China has capability to produce every armament comparable to western products, the technology and industrial base of the western countries are ahead of the Russia and China. The democracy in western countries helps their companies to compete each other according to free market rules. The western company’s ability to engage with the foreign countries is better than Russia and China companies. However, China’s economy is getting more powerful every day with their engagement to free market rules. In spite of their regime, China’s relations with the other countries are improving in terms of democracy. The trends of the last decade in military spending and achievements in defence sector continue similarly for the following decades than the technology and the industrial bases of these two countries may exceed the capacity of the European Countries. These incidences may change all game plans of Europe defence market and affect the future of EDTIB.

**Strategic autonomy through business**

Having and maintaining a strong and dynamic EDTIB needs major investment through national and European defence programs. However, it is also mandatory that the EDTIB win international tenders on export market. Attention should be driven to competitor countries that are able to deliver war material and to analyze their economic strategies (the race to performances is not analyzed here). Can EU provide the same strategies? Has EU this capacity? For this analysis, we will focus on submarines markets as an example. Submarines are expensive (main budget of MoDs), with incredible operational capability and provide also an image of might for a country.
Selling by prices

Buying war material is mainly a budget business. Far from the concern of the forces, purchases are limited by budget cuts. The price then becomes a determining criterion during the international competitions. In this context, apart from the traditional solutions (price/performance offer according to the budget / customer needs), two other options are available to customers: low cost products and second-hand products. On the market of "cheap" products, China is indeed the first country to come forward, helped by a very low labour cost and large-scale production. Having owned French submarines (Agosta type), The Pakistan navy was seduced last year by a Chinese offer of eight submarines. The French technology was not able to fight against the Chinese economic power. Other countries like Thailand, Vietnam or Bangladesh have taken the same decision and are supplying themselves in China in the maritime domain. Russia is also one country capable of winning international tenders through attractive commercial offers. On the other hand, Russia has another interesting capacity: its second-hand... This allows the acquisition of war materials with reduced cost, if the forces arrange the age and therefore the performance of the equipment. Russia is therefore clearly ahead of this market, having produced a considerable amount of military equipment in the past. Their recycling allows countries with limited means to have an international visibility.

What can EU do in the case of a pure price war? The EDTIB understands the importance of the market where mainly price matters. The costs of European studies and production do not compete with China or Russia, but the Design to Cost approach (designing equipment according to the allocated budget) is increasingly taken into account. For example, DCNS can now offer submarines at reduced prices, certainly with decreasing capacities, but this allows at least being able to participate in tenders that were previously inaccessible, for lack of offers. As for the occasional market, some European countries like France, Germany or the UK supply this market with some equipment but the low volume of available / produced systems does not allow creating an effective competition. Only a real Europe of Defence with standardized means could provide a competitive offer in these markets. Streamlining the EDTIB will limit competition within EU and will reduce production costs.

Selling by diplomacy

Of course, the sale of military equipment is only possible between friendly countries, with a common aim or strategy. If the buyer is always a country / Ministry of Defence, the seller can be a company or a country.

In the case of sale by a company, G2G (Government to Government) agreements can be added. These agreements foresee a strengthening of political ties between the two concerned countries and have a direct impact on the negotiated contract. This can be a buy-group opportunity in order to reduce acquisition (In 2017 the German shipyard TKMS sold submarines to Norway with the help of the German government which bought two identical submarines at the same time) or a strategic contractual supplement, such as a Transfer of Technology (see next chapter) or a transfer of operational knowledge (Operational training of the Malaysian Navy by the French
Navy inside Scorpion contract in 2002). If European countries are able to sell equipment under the aegis of G2G agreement, a common defence policy will be the only way to continue to deal in the future if the European DITB is rationalized.

In the case of sale by a country, it is a direct sale of a military system own by a country (or ordered / currently in production). The most known case is the FMS process (Foreign Military Sales) done by the USA, where the US government deals with its own systems. The UK is also familiar with this process. It allows:

✓ For the buyer:
  • Avoid the management of tender
  • Ensure fast and sure delivery of an operational item, warranted by the seller country
  • Use of an operative supply chain from the seller country
  • Ensure a long term partnership with the seller country

✓ For the seller:
  • Ensure a turnover of material inside forces
  • Maintain production of the national defence industries
  • Install its strategy outside its borders

Performing business with FMS type sales is a major advantage. This provides strong political and commercial ties and offers to the defence industry long term business. Can Europe in the future carry out this type of sale? First of all, it requires an European defence force, equipped with standardized means (necessity of having identical operational requirements between the MSs), significant (a part will be sold therefore it is necessary to ensure turnover) and attractive for countries wishing to acquire them. This mainly requires having a strong Europe with a strong image, capable of guaranteeing the safety of the countries working with European FMS.

Selling by independence

When acquiring equipment, many countries want to gain autonomy / independence. It became mandatory to involve their local defence industry. Different means are possible depending on the specific rules of the buyer country: ToT (Transfer of Technology), local content, direct or indirect offsets compensation, cooperation ... This can be done with or without G2G agreement. EU which now has the benefit of state-of-the-art technology has many arguments in this approach, but it requires constant preparation for the future. For this, it seems interesting to rationalize the European defence industry and to define research and development programs at European level in order to share financial, human and industrial resources. This will maintain a high level of technology and will allow providing constantly international cooperation offers.
Opportunities and risks for the EDTIB

International traffic in arms regulations - ITAR

ITAR becomes a strong difficulty for relationships between US and EU nations. At the beginning, in the 70’s, ITAR was very comprehensible in a Cold War context. For US authorities, it was necessary to prevent technological weapons to be sold to unsure countries. This regulation was seen as vital to protect the technological edge of US forces. Additionally, it encompasses the US extraterritoriality of US laws for all services and goods designed or produced in the US. Unfortunately, it is very simple to find many examples showing that US Munitions List was not sufficient to prevent strategic surprises: In the 80’s, the Iranian air forces fighting for Ayatollah Khomeini was equipped with F-14 Tomcat with AIM-54 Phoenix AAM!

ITAR showed a lot of drawbacks. Even in the US, industry understood that it was a limitation for exportation and cooperation between allies. US DOD Robert Gates launched in 2010 a reform to change this system. His judgment was definitive: "the current arrangement fails at the critical task of preventing harmful exports while facilitating useful ones". The reform aimed to simplify rules, by diminishing the size of the USML (United States Munitions List) and giving more facilities to export equipment to allies.

But ITAR should not only be seen from a US point of view. Too often this regulation can be used by US authorities to block the exportation of EU countries to non-EU nations. This regulation is then used for unfair competition practices. The natural reaction is to develop ITAR free equipment like the satellite industry did. However, it would represent a huge financial effort to develop ITAR free equipment. And sometimes it is difficult to find available technology outside the US market. More than that, it is necessary for establishing a strong EDTIB to be able to buy US equipment compatible to EU equipment. For instance, it is often seen that EU frigate or EU aircraft equipped with US missiles to be sold to Middle East customer.

✓ Opportunity: Buying technology in the US, but ITAR free technology only
✓ Risk: US keep control of high technology equipment; EU armament more costly; EU armament less efficient

Export market

A clear target of establishing a strong EDTIB is to export a larger part of the armaments developed in Europe. It was interesting to see that UK responsible, during SERA week in London, told many time that it became one of the most sensitive question. Defence expenditures are growing almost everywhere in the world, but the market share of the European companies is still limited. More than 60% of armaments trade is in the hand of US or Russian companies.

The only way to increase this performance is to show that Europe is a real and trustfully partner of Middle East and Asian countries, the main exportation areas. If each European country
continues to promote independently its own industry and its own product like now, Europe will remain a second rank player.

 ✓ Opportunity: exportation must be a political priority
 ✓ Risk: EU companies stay regional leader without capabilities to compete US firms

Innovation

EU’s capacity to provide for its own security depends on EU’s ability to innovate and to ensure technological leadership. Research and technology forms the basis of effective defence capability. Defence research in innovative technologies, products and services is key to ensuring the long-term competitiveness of the defence sector and Europe’s strategic autonomy. At present, defence research is primarily a national affair. Incentives to cooperate are lacking or inadequate. Member States have cut their defence budgets over the last decade. Defence research and technology expenditure has suffered from cuts in national budgets. In the future, more investment in defence research is required both at the national and the EU levels to strengthen the EU technological base in the area of defence technologies, products and services. EU funded research programmes may help address this issue by fostering cooperation and means to achieve EU strategic objectives.

EDA

 ✓ Opportunity: the implementation of specific actions related to launching the European Defence Fund and research window in order to fund collaborative defence research projects at the EU level.
 ✓ Risk: Technological gaps, national interest to develop and maintain as many national capabilities as possible

Regulation

The two Directives on defence and sensitive security procurement and on EU transfer have been adopted with the goal to improve the functioning of the defence market and increasing competition, while taking account the specificities of the defence sector.

The evaluations of the two Directives show that they are broadly fit for purpose and that no legislative amendment is necessary at this stage.

However, some shortcomings have been identified and need to be addressed. The Commission intends to focus on the effective implementation of the Directive on defence and sensitive security procurement, including through enforcement, to clarify the interpretation of exclusions of the Directive to support procurement authorities in the application of the rules, to revise the guidance on the subcontracting provisions in order to increase flexibility for procurement authorities, to provide guidance encouraging Member States to fully use the flexibility of the Directive for cooperative procurement. The Commission intends to adopt recommendations for a harmonised functioning of General Transfer Licences in the first quarter of 2018.
All these actions are extremely useful for a stronger and more competitive EDTIB, and EU institutions show the commitment to accomplish this outcome.

In a future scenario, we emphasize that a change of the political context (a truly common European defence becoming reality) would ask for the review of the EU applicable legislation. Breaking the connection with the present, in an "extreme" approach, Committee 2 would make some proposals, seen as opportunities for a positive impact on the EDTIB. Some of them can be considered maybe too radical or being unrealistic for the moment.

In line with the above, Committee 2 appreciates that the following proposals may be considered toward a more competitive and efficient defence and security sector:

✓ to set the minimum EU level for defence expenditure and defence R&D expenditure (percentage from GDP) for the MSs and regulate this minimum level and the obligation to allocate these funds. If a MS doesn’t fulfil the obligation, the European Commission is mandated to start the infringement procedure.
✓ to regulate some financial advantages for defence collaborative programmes;
✓ to set up a roadmap for the gradual phasing out of article 346 TFEU.

The European Commission should concentrate on a transparent, uniform and strict implementation of the rules and mechanism, as suggested in the Defence package, across Europe, and enforce a strict interpretation of article 346 TFEU, and EDA should prepare national governments and defence industries to accept the benefits from abolishment of article 346 TFEU.

✓ to increase the EU competences in defence, throughout the modification of the treaties.

Gradually, defence will migrate from being at the heart of national sovereignty and decisions on military capabilities remaining with Member States, toward the EU, which, in time, will have the responsibility of European defence.

✓ Opportunity: European legislation related to defence budget, defence innovation budget and defence and security procurement which intensifies competition.
✓ Risk: MS might consider this initiative as an attempt to their national sovereignty.

Cooperation with NATO

Developing a strong EDTIB needs also to reinforce links with NATO. The Alliance plays a key role for interoperability among the Allies: all NATO nations fire the same munitions, have compatible radios and have the same references for protecting their vehicles. These NATO Standards (STANAG) give all NATO nations the capacity to be interoperable. This role has been accelerated by the creation of NATO ACT (Allied Command Transformation) in 2002.

General Mercier, ACT commander, identified six major domains to work in common: C4ISR, logistics, support, live exercises, new capabilities and human resources. His staff is working to develop
interoperable systems and multiply conferences with industrials. The live exercises offer the opportunity to deliver political messages but also to try interoperability between various systems.

EU will need this expertise to build a strong EDTIB and to have the insurance of interoperability with US forces and other NATO nations.

✓ Opportunity: Develop weapons systems with EU budget but fully interoperable with NATO STANAG.
✓ Risk: Weakening ties with NATO, loss of interoperability, competition between NSPA and future European procurement agency.

RISK ASSESSMENT

As we all had been informed during this SERA session, the European Commission on November 30 has adopted the European Defence Action Plan, which in fact provides two window programs (R&D and capabilities) to build strong, Global market compatible EDTIB. During SERA session discussions, it was emphasized, that Desired End state for that strong EDTIB was realized as EU strategic autonomy, providing EU nations 'The ability, if necessary, to decide and act independently from others at the highest political and military level'.

All in all, sounds attractive and ambitious, but EU nations still have to commonly agree 'If this ambitious strategy is affordable and exceptional to all, and finally, 'How to achieve this demanding goal?'

Our Committee members during debates have emphasized a number of very important factors to be considered on the way to strong EDTIB:

1. Cooperation with NATO, operating and maintaining NATO interoperable systems and equipment (STANAG).
2. Any Government imposed ITAR requirements.
3. Export market dominated by the US, Chinese and Russian companies.
4. Possible 'brain drain' from EU to the US educational system and industries.
5. Competition in between EDA, OCCAR and different NATO Procurement agencies to offer procurement agency role for EU nations.
6. The US Government has some concerns that implementation of the European Defence Action Plan might weaken Transatlantic link between the US and Europe.

Beside these recited factors, Committee members have also agreed, that number of political level milestones should be met to positively enable reaching of the Desired End-state. We have all agreed, that dialog with the US should be continued; there were a broad consensus that NATO article 5 is still a cornerstone for European Defence and the US role is really important. So, EU on its way to Strategic Autonomy a strong EDTIB should maintain dialog with the US Government, different research institutions and industries.
Besides that, numbers of milestones were offered by Committee members:

1. Political agreement on Security and Defence policy.
2. Agreed Common decision making process.
3. Political will to accept common vital interests and share common values.
4. Agree upon common funding mechanisms for integrated economies.
5. Agree on the access to natural resources.
6. Agree on building well-equipped, modern and interoperable military forces to back up a Security and Defence policy.
7. EU Directives must be aligned with the agreed European Defence Action Plan.

When Committee members have agreed on the Desired End-state, important factors to consider and political milestones, they were asked to identify and to assess the risks for the European Commission proposed strategy. Afterwards, proposed Risk registry was created.

**Risk Registry**

<table>
<thead>
<tr>
<th>No</th>
<th>RISK</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Nations will not agree on The European Defence Action Plan implementation attempting to keep strong Transatlantic link and to maintain NATO collective capability development and sustainment.</td>
</tr>
<tr>
<td>2.</td>
<td>The US will keep control of high technology equipment; EU armament will be more costly and less efficient.</td>
</tr>
<tr>
<td>3.</td>
<td>EU companies stay as regional leader without capabilities to compete with the US industries.</td>
</tr>
<tr>
<td>4.</td>
<td>Strategic autonomy instead of strengthening EDTIB will lead to isolation and will in fact degrade EU industrial compatibility and technological development, followed by &quot;brain drain&quot; out of EU.</td>
</tr>
<tr>
<td>5.</td>
<td>There will be no agreement on EU Security and Defence policy.</td>
</tr>
<tr>
<td>6.</td>
<td>There will be no agreement on Common decision making process.</td>
</tr>
<tr>
<td>7.</td>
<td>There will be no consensus on common EU vital interests.</td>
</tr>
<tr>
<td>8.</td>
<td>There will be no agreement upon common funding mechanisms for integrated economies and access to natural resources.</td>
</tr>
<tr>
<td>9.</td>
<td>Duplication of national structures and test centres.</td>
</tr>
<tr>
<td>10.</td>
<td>Different national interests and capabilities will not allow EU countries to build well-equipped, modern and interoperable military forces to back up a Security and Defence policy.</td>
</tr>
<tr>
<td>11.</td>
<td>Current EU Directives could jeopardise EDTIB if consistency / coherence is missing.</td>
</tr>
</tbody>
</table>
**Risk Assessment Diagram**

To come up with possible risk assessment, Committee members were asked to assess probability for risk to appear (scoring that possibility from 1 to 5) also to assess possible risk negative impact to the Desired End-state (scoring that impact from 1 to 5).

Committee Proposed Risk Assessment is reflected in the diagram below.

Our Committee members had no ambition to propose any risk mitigation measures. It would require another SERA session to attend, and as you see from the diagram, almost all risks are related to a political will and ability to reach consensus. We have all agreed that risks related to political willingness simply could not be mitigated. Willingness is present or it is not. When it goes to a consensus, Committee has agreed that consensus usually represents only a result which was possible to agree upon, but not the one initially desired.

In the same time, it is more than obvious that if those risks remain without any attention, they will definitely jeopardise the idea of the European Defence Action Plan and its strategy.

To discuss possible way-ahead, our Committee came with two scenarios and conducted SWOT analysis.

First scenario was named as “EU Autonomy”, with the assumption that the EU will be consolidated politically and will be focusing its defence efforts in order to balance within or outside NATO. It was also considered that EU Industries will merge and cooperate around platforms and capabilities with decentralized specialized country contributions. Scenario envisages the EU with its own EU defence force on the same playground as the USA.
Second scenario was named as "Collaborative EU", assuming that EU will remain close to the US.

<table>
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<tr>
<th><strong>STRENGTHS:</strong></th>
<th><strong>WEAKNESSES:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Highly specialized and efficient development and production</td>
<td>Higher costs resulting in higher prices</td>
</tr>
<tr>
<td>Simplicity to market EU products within EU</td>
<td>Decreased global competition</td>
</tr>
<tr>
<td>Shared burden and focus on investments regarding strategic autonomy</td>
<td>Customized/nationalized requirements are limited</td>
</tr>
<tr>
<td>Established and harmonized operational requirements</td>
<td>Less national support in marketing the products</td>
</tr>
<tr>
<td>Strong EU support for marketing the products</td>
<td>Less interoperability with EU outsiders</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>OPPORTUNITIES:</strong></th>
<th><strong>THREATS:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Consolidation and thus potentially increased synergies within:</td>
<td>Brain drain due to regional specialization</td>
</tr>
<tr>
<td>o Education</td>
<td>Increased time to field due to bureaucratic and political agreement approaches</td>
</tr>
<tr>
<td>o Infrastructure</td>
<td>Weakening of NATO</td>
</tr>
<tr>
<td>o Work force</td>
<td></td>
</tr>
<tr>
<td>o R&amp;D investments</td>
<td></td>
</tr>
<tr>
<td>o Production (economies of scale)</td>
<td></td>
</tr>
<tr>
<td>o Addressable new markets</td>
<td></td>
</tr>
<tr>
<td>o An EU FMS</td>
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</table>

SWOT analysis has provided additional views on the possible Way-ahead to a strong EDTIB. In addition to the risk assessment, SWOT analysis has depicted Strenthenes and Opportunities for both scenarios, in the same time discovering own Weaknesses and Threats. "EU Autonomy" from the first glance could look really attractive and promising, but the same time, "Collaborative EU" allows European nations to remain in the same trustful relationship with the US, Transatlantic link remains unchallenged and NATO strong.

Taking into account current geopolitical situation, common NATO and multinational military capability developments and existing bilateral engagements with the US, "Collaborative EU" scenario has really big opportunity to prevail.
After the last NATO summit and a Group of 7 meeting in Italy, Angela Merkel said: "The times in which we could rely fully on others – they are somewhat over". It looks like a huge shift in transatlantic relationships since the creation of NATO at the beginning of 1950's. President Trump reluctance to sustain this historical western alliance and Brexit will probably open the way to a closer cooperation between EU Member states.

It should be also underlined that the downgrade of transatlantic relations is also linked to a context of economic warfare. The rivalry between the United States and its European allies appear clearly in one of the famous Donald Trump tweets: "We have a MASSIVE trade deficit with Germany, plus they pay FAR LESS than they should on NATO & military. Very bad for US. This will change." It seems to be a veritable blackmail between economic dominance and military protection!

In such a context, building a strong EDTIB for reaching a strategic autonomy is a wise approach. The EDTIB is no longer sustainable on a strictly national basis and the EDTIB is greater than the sum of its national parts. This report is the fruit of enthusiastic discussions between EU convinced - but realistic - representatives of the Defence sector. One of the main challenges of course, as we described in the chapter "strategic autonomy for the EU" is the political will. But EU has already strong military capabilities and good industrial basis, and as we showed in the chapter "Risk assessment", EU MSs have already decided during the last European Council to follow the "EU's collaborative" approach. Which is why, we recommend a few actions to preserve and reinforce the EDTIB:

✓ Instead of trying to control the capabilities within the EDTIB, EU should concentrate on identifying lack in capabilities and finding a model on how to finance new company constellations that should develop capabilities that EU lack today. This has also been discussed in various terms in the European Defence Action Plan.

✓ It will also be very important to invest in the technological edge in order to maintain a gap with our potential enemies, but also to be close to NATO/US standard. This investment in technology will also give the opportunity to keep the best scientific "brains" in the defence sector. In this perspective, we are very interested by the conclusions of other committees (1, 3 and 4).

✓ EU should also continue to encourage the competition between companies in order to have the best value for money, but to have competitive solutions for foreign customers. In this perspective, we are also very interested by the conclusion of committee 6.

✓ EU will also have to build stronger industrial leaders, like it was done with Airbus in the civilian aircraft industry. The objective is not to create monopolistic situations, but to give to our industry more capabilities to invest and more means to fight the competition in a context of economic warfare.

✓ Finally, EU will have to implement structure to conduct the development of this stronger EDTIB. EDA and OCCAR have paved the way of this trend, but this has to be encouraged without duplicating existing MS structures.
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Committee 3

Security of Supply in the European context and its impact on the efficiency and autonomy of EU defence

Pilots: Viggo LEMCHE, Jean-Charles BOULAT, Lutz KAMPMANN.

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Col (ing.) Marie-José MARTINEZ (Chairman)
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Commander José Emilio BESTEIRO VALIÑO
Mr Christer SUNDIN
Mr Philip Mc BRIDE
Executive summary

Collectively, European nations have no common strategy for Defence and have not reached consensus on how to ensure Security of Supply, although this is vital for Strategic Autonomy and freedom of action.

Several initiatives and European Directives have been introduced to improve the situation at European level. However, the diversity of perspectives in Europe (national priorities, industrial base, links with NATO) as well as the specific requirements of the Defence sector, make it complicated to find common ground.

After assessing the current situation in the industrial, political and operational dimensions, and discussing the regulatory situation, the paper will propose levers to improve Security of Supply. These include reinforcing cooperation among European Nations, as it is recognised that Security of Supply is neither affordable nor realistic, at national level. This in turn requires defining Strategic Autonomy for Europe, including the level of competence Europe wants to retain or develop. Other levers that need to be considered include regulations and standardisation, as well as the viability and the efficiency of the European Defence Technological and Industrial Base (DTIB).
The EU President has called for a new paradigm, to foster defence cooperation in Europe and achieve a strong, competitive and innovative defence industrial base. Different drivers shape this paradigm. One key driver is Security of Supply in the European context and its impact on the efficiency and autonomy of the European defence industry.

This paper will focus on the fact that Security of Supply for defence and security procurement requires the sustainment of the European Defence Technological and Industrial Base (EDTIB). The EDTIB will only be guaranteed through Member States’ and defence industries’ commitment and the regulatory framework guiding EU level cooperation. Security of Supply also requires industrial entities to reliably deliver goods and services, in peace time and on operations, in sufficient quantities, for the lifetime of the product or service.

Security of Supply will be analysed and levers identified under respective industrial, political and operational dimensions, to achieve this efficiently and autonomously in Europe. This paper will, in particular, take into account the current context of increased focus on national defence, while globalisation and global market challenges are emerging and address the specific context of the defence market, such as the lifespan of military goods, their cost of development and the constraints of current regulations. It will also propose recommendations based on reinforced cooperation and the need to define a Strategic Autonomy strategy at European level.

**Status of EU initiatives**

Security of Supply involves, at any given time, multiple stakeholders with different responsibilities that span from political to tactical level, passing through several interwoven environments such as R&T, industrial technical capabilities, availability of raw material, logistic capabilities and the management of stocks of any single item. Prime contractors, suppliers and customers must rely on robust and reliable supply chains to guarantee sustainment and operational readiness of their defence and security products, throughout their lifecycle. Robust and reliable supply chains must constitute a confidence-based relationship between States and set conditions for Contracting Authorities to accept cross-border contracts.

After Europe’s shortcomings during the Balkan crises it was critical for the EU to find ways and means to act more autonomously, to counter future threats on its own territory and its immediate neighborhood. The establishment of the European Defence Agency (EDA) in 2008 was a major step toward developing and managing common defence capabilities in Europe and the EU member states (excluding Denmark & incl. Norway).

The Capability Development Plan (CDP) was released in 2008 by the EDA. Its primary purpose was to call for priority capabilities and secondly, to enable opportunities for pooling and sharing among the EU member states. The European Air Transport Command (EATC) and EUROMALE are valid examples of the outworking of the CDP.
The operational readiness (including the availability of new equipment) and lifecycle management of defence and security products depend on robust and reliable supply chains, because they must mitigate the risks of dependencies and failures “with the undesirable consequences of being unable to rapidly respond to demand for military equipment in a crisis situation or to be unable to operate key weapon systems properly and autonomously”. To improve the Security of Supply of defence and security equipment in Europe, the European Union has started to impose a regulatory framework on the European Defence Market. The European Directive 2009/81/EC has established a trusting, ongoing relationship between European Member States in adopting the application of Article 23 of the Directive, outlining primary factors affecting security of supply e.g. performance criteria of the procurement contract such as export controls, supply chain, IPR clauses, availability of spare parts throughout the life cycle of the weapon system, etc. Tenders contain required procurer commitments and supporting documentation from the tenderer’s national authorities in case of a crisis.

As part of the implementation of the EU general strategy, there is a new initiative for deepening defence cooperation, issued by the EU Commission in June 2017, namely the Defence Fund. The aim of the fund is to coordinate, supplement and amplify national investments on defence and in particular research and joint acquisition. This initiative will add further tools to strengthen Security of Supply within the EU but only if it is put into practice.

**Security of Supply: definition and dimensions**

**Definition**

Many attempts have been made to remove ambiguity regarding the definition of the terms Security of Supply and Strategic Autonomy but there are different views on the scope and meaning of these two terms between the Member states. This section aims to outline what is meant by Security of Supply and Strategic Autonomy and how these two terms are related in the context of the EU and its Common Security and Defence Policy (CSDP).

In the Framework Agreement, the Letter of Intent Countries(1) defined Security of Supply as: “a guarantee of supply of goods and services sufficient for a Member State to discharge its defence and security commitments in accordance with its foreign and security policy requirements” [1]. At its simplest, Security of Supply can be defined as access to the critical technologies and know-how required to sustain strategic defence capabilities but also to develop capabilities for anticipated future missions and needs.

Strategic Autonomy, on the other hand, can be seen as an EU or Member State’s ability to decide and to act independently without capabilities of third parties [2]. Thus, the question of Security of Supply is inherently linked to Strategic Autonomy, both short-term and long-term, in peacetime as well as in a crisis.

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(1) Letter of Intent countries: France, Germany, Italy, Spain, Sweden and the UK.
Defence and security equipment availability from Member States are vital for exercising the CSDP and for maintaining EU's role as a global and independent actor for the future.

For the capability planning and development processes, this requires taking all Defence Lines Of Development (DLOD’s) into account. Moreover, it is not only defence equipment and materiel but also national doctrines and concepts, personnel, training and supporting infrastructure which should be considered.

However, in this report only the Security of Supply of military equipment is discussed. To evaluate a country’s true capability in case of conflict, an overall Security of Supply study involving all systems of supply would be necessary.

Essentially, it is the Member State’s prerogative to take measures they consider necessary for the protection of their essential security interests, while retaining full sovereign national decision making on Security of Supply issues and facilitating appropriate transfer to other Member States. So key questions are:

- What strategic defence and security aspects do nations want to be secured from a supply perspective at national / EU level?
- What level of trust do nations put in their partners/neighbours to provide vital supplies for war fighting?

This leads to the paradox that in order to ensure Security of Supply, nations need to rely on other partner nations, who may want to act independently of a full European commitment.

**Security of Supply : dimensions**

**Political dimension**

Seen from a national viewpoint, Security of Supply means having the ability to take autonomous decisions in terms of engagement of the armed forces, international politics and influence (credibility and reliability).

As stated in the report of the Group of Personalities [3] there is a need to discuss and better define what level of Strategic Autonomy the EU and Member States seek to achieve, if Europe wants to remain a strong defence player and reliable partner in the future.

According to a study conducted by Artega et al. [1] it can be argued that at present, Member States’ national perspectives regarding the autonomy of decision making on defence related topics and Security of Supply, differs a lot. Some Member States have developed a vision or proposal for Strategic Autonomy at EU level. It is also evident that due to diverging perspectives, possible approaches towards deepening EU defence cooperation and implementation of a Common Security and Defence Policy (CSDP) are difficult, especially with regard to military
operations. Currently the CSDP is more focused on missions abroad and not on EU level territorial defence [2].

For the moment, autonomy of decision making in defence (or Strategic Autonomy) is maintained by developing and sustaining national defence capabilities to achieve nationally defined operational needs and requirements or the capability goals set by NATO.

At European level, a high degree of autonomy of decision making is difficult in the short term, as Europe is still building a common foreign, defence and security policy. Recent crises have shown that the European Union does not have a common approach compared to the USA. Full autonomy is out of reach, as it is both unrealistic to control the whole supply/technology chain and it is unaffordable. Many recent crises have shown that the EU Member States still largely depend on USA capabilities and technology for foreign operations.

Furthermore, nations may have different points of view regarding Security of Supply, depending on their defence industrial capability, their economic and military strength and their military alignments / constitutions and membership of NATO, European Union, EDA etc.

Operational dimension

From an operational perspective, Security of Supply is key to operational sovereignty. This can be seen from different perspectives:

✓ Freedom to operate anywhere (see political perspective) and use military equipment as required (no limitations)
✓ Freedom to upgrade and maintain over time (which means that industry has to be responsive throughout the product lifecycle)
✓ Confidentiality of operations needs to be ensured through maintenance operations (information on operations is likely to be recorded on equipment, thus the need to trust the supplier and the whole supply chain to avoid potentially non-aligned nations recording data).

Industrial dimension

Industry also needs to make sure that it will have no limitations in conducting business, either with their suppliers or their customers.

Defence equipment procurement usually involves long term investments (30-40 years). It relies mainly on large companies, who are able to deal with complex projects, as well as SMEs and startups for innovation. Ensuring that they each can sustain supply for such long periods of time (given the lifecycles of defence equipment) is a challenge, as throughput must be maintained, skills retained and facilities/infrastructure/tooling /test equipment secured for the long term. Also, the need for new equipment and related order volume may change over time, rendering the business case for defence industries less robust and obvious. This may result in a lack of
investment from companies eager to improve efficiency and profitability. Clearly, government can significantly mitigate this risk by introducing innovative long-term, incentivised, contracting models.

**Main Considerations**

The Defence market is a specific market.

The defence market differs from the civilian market:

- ✔ Projects and equipment lifecycles may cover very long periods of use, i.e. over 30-40 years. As stated above, this provides a challenging business case for industry.
- ✔ There is a clear desire (as well as an evident urge) for research, innovation and development. Governments have traditionally funded the majority of research and development and innovations have found their way to the civilian market; this technology flow is now reducing and reversing in distinct areas.
- ✔ Most of the European National Armed Forces have different doctrines, Concepts of Use, Scopes of Work, Urgency of Requirements and Operational Deployments which leads to different needs and a great variety of operational requirements for the same type of equipment, thus, causing difficulty in procuring single solutions for the Member States’ Armed Forces.

The industry at a major turning point

Since the end of World War II, most countries have concluded that a major feature of security policy is the Defence Industrial Base (DIB).

Nations have maintained their own defence industries, constantly ready to respond to conventional threats and nations knew where the threat was likely to arise.

At the start of the 1990s, the world began to look very different. Defence spending fell by around a third in real terms between 1989 and 1996. The defence market consolidated accordingly and the number of major defence companies reduced through mergers (e.g. EADS, Thales, MBDA, etc.).

In many countries, the rise of international terrorism and enduring regional conflict are dominant factors of change in security planning, as well as geopolitics. Defence spending is being adjusted to focus on more flexible, responsive and mobile force structures with an increasing focus on logistics and lifecycle support. At the same time, unrelenting pressure on public funds means new methods are being used to develop, acquire, finance and support defence equipment, including a determined effort to make wider use of cheaper, non-specialised Commercial, Off-The Shelf (COTS) technology wherever possible.
Usually a defence equipment company could not expect to succeed without maintaining a significant level of business in its domestic market. It is beneficial for the launch customer to be the domestic customer and share in development risk. National identity still provides a source of competitive advantage against foreign competitors in many segments of the market.

Governments are now more interested in solutions and capabilities than equipment. For contractors, this means an emphasis on through-life support rather than on delivering equipment and returning only when spares or repairs are required. The driving force behind this shift in emphasis is a continuing effort to improve the procurement, which, in some countries results in transferring risk – technical, financial and operational – from the public to the private sector. This in turn stems from, once again, the continuing pressure on Governments to reduce spending and reliance on Government resources.

**Geographic Considerations and Logistics**

Security of Supply has to be increasingly considered in the context of globalised production and trade. No longer lodged in local geographical areas and small logistic systems, Security of Supply requires effort to achieve maximum stability of the supply chain, to ensure the right goods at the right place at the right time. That means wherever geographical considerations influence missions, operations and procurement, logistics must provide the planning framework for the management of material, service, information and respective command and control to ensure a stable supply chain over the required time period. Furthermore, it requires supporting mobility, which means transportation must be utilised constantly because the transport service itself cannot be stored. The capacity of transportation infrastructures and modes are vital prerequisites to achieving the levels of transportation needed to secure the supply chain.

**Existing Regulatory Frameworks**

Export Control law provides an extensive series of regulations enforced by the United States Federal Government, to regulate the distribution of strategically important information, equipment, products and services.

**Regulatory References**

- Decree 2013-700 of 30 July 2013 establishing the regime of war materials, weapons and ammunition.
- Decree No. 2011-1467 of 9 November 2011 on imports and exports from the European Union of war materials, arms and ammunition and related materials and intra-Community transfers of defence-related products

In Europe, all countries restrict the circulation of defence related products within the internal market. All Member States have their own legislation to regulate import, export and transit of military goods. Although the means prescribed in these national rules are generally similar, they do present a significant number of important differences in terms of scope, competent
authorities, procedures and timing. A common feature shared by all Member States is the reliance on prior licence schemes to manage such transfers. Practically, this means that exporters have to obtain a national export licence for shipping defence-related goods outside the national borders of each Member State. No distinction is made whether the destination is another Member State or a third country.

In addition, there are the International Traffic in Arms Regulations (ITAR) and the Export Administration Regulations (EAR), which are two important United States export control laws that affect the manufacturing, sales and distribution of technology worldwide and therefore, may significantly reduce EU companies or countries ability to conduct business outside USA authorised countries.

ITAR contains a United States Munitions List (USML) of restricted articles and services. EAR contains a Commerce Control List (CCL) of regulated commercial items, including those items that have both commercial and military applications.

Current legal framework related to Security of Supply

A basic review of the different legislative regulations of the EU Member States clearly shows that, in the field of Security of Supply, there is a long way to go. Whilst it is true that for most of European Member States, Security of Supply is an important matter of concern, all European countries have a specific national Security of Supply policy. Their approaches to this particular subject are quite different and a certain over-protection of the national industrial market is common place.

After reviewing Member State’s national legislations, it can be stated that all States contemplate Security of Supply in their procurement procedures but, when we study their national policies on sharing information over stocks and inventories, we find that, in this particular field, most European NATO members that also belong to European Community, rely more on NATO structures than on those of the EDA.

In summary, even though the "Framework Arrangement for Security of Supply" between subscribing Member States in "Circumstances of Operational Urgency", endorsed by the EDA Steering Board in 2006, states the agreement of the subscribing Member States to assist and expedite each other’s contracted defence requirements, particularly in circumstances of pressing operational urgency, exercising also their best efforts to increase the level of mutual confidence amongst themselves, there is a lot of scope for improvement in this field.

A further problem is that, for several federated Member States, Austria is an example, the competence to establish crisis management laws and regulations concerning the economy and in this regard, involving Security of Supply issues, does not typically rest with the State but with the single provinces.

When studying the possibility of SMEs participating in the supply chain, we come across cases like that of the Czech Republic, which defines a provider of Security of Supply as "an individual
with a place of permanent residence in the Czech Republic, or as a corporate entity with a registered office in the same place as well as an organisational constituent of a corporate entity with a registered office outside of the Czech Republic but conducting business in the Czech Republic and being registered as a possible supplier in a case of an emergency”. This regulation clearly hinders the participation of many European SMEs in the aforementioned supply chain.

Several countries have signed bi or multi-lateral Security of Supply agreements with some European neighbours. For example: Austria with Germany; Belgium with the Netherlands (inside the BeNeSam agreement). FR and UK have been working on "Generic principles for British-French industrial and technological cooperation" with the aim of reducing unnecessary duplication whilst ensuring the Security of Supply of each partner. FR and UK have in particular set up specific arrangements of mutual dependencies within the MBDA Group.

Some EU countries have agreements in force with NATO agencies and/or the USA. Such are the cases of Belgium with NSPA (NATO Support and Procurement Agency), Hungary, with the USA Department of Defence (DoD), and Italy also with the USA; an agreement that allows the Italian government to access the American DPAS system (Defence Priorities & Allocations System programme; UK also maintains a bilateral Security of Supply arrangement with the USA DoD.

As we can see, the arrangements are very diverse and do not help to implement what has already been established in Directives 2009/81/EC and 2009/43/EC.

Reliability of the Supply Chain

In a world of transnational companies (e.g. Airbus, Thales, BAe) and globalisation, controlling the whole supply chain may appear utopian :

✔ Is a national/European company more trustworthy than a USA based company, even if some of its activity is located in third countries?
✔ How can a supplier be controlled both in industrial terms (is the company sustainable over a 5-10 year timeframe?) and strategic terms (has the company full autonomy to export defence related equipment to the target country?). Some partners may be trusted but may develop difficulties for political reasons (such as changes in local export rules).

However, this important issue is not the focus of this paper.
Levers and recommendations to ensure Security of Supply

Define level of Strategic Autonomy

Based on the assumption that Strategic Autonomy offers nations the freedom and the ability to independently decide to take action, it is important when defining the Security of Supply strategy to first agree on the targeted level of Strategic Autonomy. This is valid both on a national level as well as on an EU level, as it is understood that there will always be a certain number of non-European suppliers. This in turn means that European countries are able to reach a consensus on what are critical technology areas that need to be kept at European level. Subsequently, effort is required at the EU level to safeguard the supply of common equipment or joint use equipment.

As the security situation becomes more fragile and the speed of technical development increases, Europe’s Strategic Autonomy depends, even more, on a collaborative approach in the area of defence.

By defining their level of Strategic Autonomy, nations may also consider having suppliers outside Europe, subject to not undermining Security of Supply. In specific areas there is a lack of EU suppliers/supplies, therefore, it is of paramount importance to establish agreements with non-EU countries, in order to protect the Security of Supply.

Cooperation

Collaborative approach

A joint approach on capability planning and procurement needs to be built on best practices, and take into account all possible means to encourage public and private investment in this domain. The EU can act as a facilitator, enabler and accelerator for defence cooperation schemes as well as a provider of targeted incentives to support the Member States’ own development of capabilities [3]. Therefore, through longer term planning, EU Member States should align the procurement timelines and planned lifecycles of their critical capabilities. The procurement of new common equipment should introduce contractual measures aimed at guaranteeing the Security of Supply, and ensuring interoperability.

One possible "vehicle" for more collaborative EU level defence is an initiative introduced by the European commission and EDA. As such, the Preparatory Action followed by an EU funded Defence Research Programme (EDRP) may form a structure for joint R&D, capability development and lifecycle management.

EU efforts should be aimed at reducing the fragmentation of the market through collaborative projects but also offer industry the possibility of having access to a wider market through harmonisation of requirements and avoidance of specific national equipment requirements, when possible, and taking advantage of the synergies with civilian products. Pragmatic approaches such as the Security of Supply Framework approved by the EDA members in 2014 included a statement within the Code of Conduct on prioritisation between Member States and industry. It emphasised that the Code of Conduct should be seen, "as a means to
involve defence industry in the EDA Security of Supply framework, in order to demonstrate its commitment to meet Member States enhanced Security of Supply requirements in defence procurement”. This needs to be further developed, enhanced and incentivised to ensure its use. Although all 27 EDA Member States and Norway have agreed these initiatives, it still has had no application.

Treaties and Agreements on Security of Supply are some of the key elements that will ensure an improved situation when applied to industrial cooperation, open markets, reduced customs requirements and access to financial resources, to name just a few.

Cooperation is a key enabler to the enhancement of Security of Supply, through alignment of operations, needs, developments and industrial outputs. Cooperation (Political, Operational, and Industrial) should be further pursued in several ways [7]) : defence capability planning, optimisation of defence capabilities, defence innovation and integration on medium/long term.

Recent developments at EU level, such as the Defence Fund are a step in the right direction towards building common capabilities in Europe.

Finally, requirements of offsets are limiting the possibilities of cooperation, in the sense that they reduce the scope of Strategic Autonomy to a national perspective and may undermine the industrial effectiveness. However, in some cases, such requirements also offer the possibility to setup meaningful industrial partnerships. So offsets should not be established as a rule.

**Mutual dependencies**

As nations cannot afford to secure their supply at national level, they need to depend on foreign suppliers/nations. This means that they should build a strong and confident relationship with these suppliers/nations. One way to do so is to create mutual dependences in terms of industrial capabilities, such as the ones that France and the UK are putting in place in the missile domain (with two countries producing different parts for a common munition, there is mutual need to guarantee the availability of supply).

To build this mutual dependency between a supplier and a nation is not easy, as it will require the supplier nation to commit to Security of Supply, or the buyer nation might even require to be part of the Supply Chain, to secure mutual dependency. Nations may also consider investment in other countries in order to “protect” the procurement capability of strategic items.

Whilst individually, European nations may not survive a significant military engagement, they may need to rely on each other to face sustained and large scale operations abroad. Building mutual operational dependencies also offers a way to improve the Security of Supply. Pooling and sharing equipment or capabilities is one example.

Conversely and sometimes with the support of Member States, companies also need to develop mutual dependencies, in order to optimise their investments and avoid duplication or competition among themselves, when not relevant.
Better utilisation of EU Directives

Efforts have been made to open the European defence market for competition by harmonising defence procurement legislation through the EU Defence and Security Procurement Directive, which entered into force in 2009. A well-functioning defence market is a valuable resource to all European defence contractors and it will provide for the Member States to acquire and maintain their capabilities in a cost effective manner.

So far, however, the goals of the Directive have not fully materialised and the defence market has not yet reached its objectives. Failing to provide a level playing field in the Industrial landscape puts sustainable European Defence Cooperation at risk. One concrete means of improving Security of Supply at the EU level is to "incentivise" Member States to open their national defence markets, as intended by the EU Defence and Security Procurement Directive.

The political will within the larger manufacturing nations, to place contracts outside their own industrial base will however depend on the capabilities and security that “foreign" companies offer, as well as on the constraints which may be faced when buying "abroad", items that are strategic and can be purchased nationally.

Another approach could be to acknowledge the fact that alignment of national interests and the Defence Procurement Directive are important for sustainable defence cooperation in Europe. As matters in this area have proven to be extremely complex, the conclusion may be drawn that the procurement strategy is best evaluated by the Member States on its merits, case by case and based on project specifics.

Therefore, more effective implementation of the Directives 2009/81/EC and 2009/43/EC is required but this will only work when Security of Supply is ensured at European level. Although the European Directive’s launch is an important step to a common European Defence Market and is the nucleus of a European Defence Technological and Industrial Base, the Member States must take concrete measures to establish Security of Supply as its prerequisite, hence they must implement a system of appropriate guarantees to European defence companies and their suppliers and their respective armed forces. Despite the effect of globalisation in defence, appropriate guarantees must limit the interdependencies of suppliers and their prime contractors in a competitive European defence market.

This is why, modifying both Directives or drawing up a new European Directive specifically related to Security of Supply, based on the existing non-binding EDA initiatives would take Security of Supply a step further, provided Nations agree to do so.

Developing collaborative approaches through multinational organisations

Procurement agencies like OCCAR, NATO agencies (NSPA, NETMA) and EDA (for R&T studies) as multinational organisations, facilitate cooperation and standardisation between Member States. So it is recommended to make optimum use of these agencies for cooperative projects. These platforms
shape, among others, the framework for technical publications, material supply and management and maintenance. Furthermore, alignment of supply chain management issues could help standardise performance measurements, collaboration across organisational boundaries (and various Member States) and the adoption of shared efficiency in delivering goods and services to customers. Hence they could develop shared customer relationship activities and initiatives, distribute business intelligence, determine common information and technology requirements and support information sharing and integrated supply chain operations and business planning. Thus, procurement agencies and multinational organisations represent effective levers for Security of Supply.

Pooling

Reliability, availability and endurance parameters must be agreed for strategic equipment procurements. Reliability defines the probability of failure and combined with ability to repair and time to repair, it defines the number of spares needed to meet targeted availability for the specified period (endurance). In the short term, this can be achieved via local storage of critical spares. In the longer term it may be achieved through larger distributed storage or the guarantee of fast supply chain reaction to demand. To be able to guarantee availability, the whole Supply Chain must be scrutinised and second sources identified at all levels. In a system with many users, the lifecycle cost can be reduced significantly by pooling of critical spares, without reduced availability, ensuring the Security of Supply.

The potential saving in the cost of critical spares with a common pooling and sharing agreement between countries is substantial, but also requires very clear regulation of priorities in critical situations and increases demand for common maintenance plans and standardisation.

Create a viable defence market for industry

In order to improve industry’s business case, as well as have access to a wider market through harmonisation and/or optimisation of requirements and avoid specific national equipment requirements when possible, the following measures can be encouraged:

- Reducing and harmonising regulatory constraints, especially export regulations, in order to facilitate access to a wider market. By doing so, companies would not be so constrained by the defence markets and could make reasonable business plans with clear visibility of the markets that will be accessible.
- Making use of civilian products and methods when relevant (use of COTS or civilian developments).

Another way to open the defence market is to require, from the outset of a project, the development of open architectures. As an example the Future Airborne Capability Environment from the USA Department of Defence is aimed at opening competition for future upgrades of defence systems by encouraging the independency between different functionalities and the decoupling of hardware and software. This will prevent customers from being confined to one supplier, where there is a concern of obsolescence and high cost proprietary systems.
In addition to the creation of a viable defence market, companies may be incentivised to remain in the Defence sector through:

✓ Support of the Government on R&D investment and procurement (as previously described) provided it is as efficient as possible.
  • This not only keeps companies in the sector but also allows them to explore areas that would not be possible in the civilian world, as time to market and competition are significant challenges.
✓ Support of the Government for sales "abroad".
  • As the sales of defence equipment are restricted and may be part of foreign policy, Governments are also a powerful part of the sales teams, and therefore key to success.

Reduce and Harmonise Regulatory Constraints

Harmonising Export Rules

In order to support industry’s ability to conduct business, harmonisation and simplification of export regulations must be encouraged. There are a variety of levers which may be applied:

✓ Firstly, nations in Europe should seek to have a common export policy (or as common as possible), without interfering with national sovereignty. The aim is that the industry complies with the same rules whichever country they are located in and whichever EU country they wish to export to. As a common foreign policy is not yet a reality in Europe, a pragmatic way to do this would be to set up agreements between partner nations in Europe to facilitate export.
✓ In addition, nations should seek to harmonise their rules in terms of export control, including the way they define military equipment, alternatively, nations could agree on the rules on the EU country exporting the main product and not on the rules of the country of the sub-system, unless there is a major political objection from a sub-supplier nation.
✓ Finally, the use of global licenses that facilitate the work of transnational companies, should be further developed.

Standardisation and harmonisation of rules

To increase the opportunity for common military operations and to strengthen the competitiveness of the EU defence market, it is essential to have common standards which allow interoperability. This has been achieved, to a great extent, in the telecommunications business. As development in many areas is led by the private sector, standards should be aligned with civil demands as much as possible. A real opportunity is to adopt the NATO standards, as many countries are already part of NATO and to focus effort on EU standardisation where there is no duplication or no rules exist.
Other ways to harmonise the rules are through collaborative programs. For example, common certification and qualification rules have been developed for the A400M, based on the civil regulations. When discussing rules, regulations, standards and legislative harmonisation, there are two overall perspectives, pro and con.

One could argue, that increased harmonisation through standardisation, regulations, directives, etc., will reduce dependency on a specific provider’s spare parts. At the same time, it ensures that a common baseline language is provided for both suppliers and procurers to use when discussing requirements. Small and medium sized companies will more easily be able to support larger companies as sub-suppliers, increasing the number of beneficiaries of a strengthened European military industrial base.

Within the EU the military industrial base must live with a wide array of standards and regulations of both civil and military character. For example, there are NATO Standardisation Agreements (STANAGS) and US Military Standards (Mil Std.) that have assumed “super-national authority” and similarly, national standards. However, in addition to these, there is an ever increasing number of EU Directives and EU legislation; Directives which were not meant to regulate within the military sphere, but end up doing so when implemented by the individual nations. For example, the REACH Directive. This Directive aims to improve the protection of human health and the environment through the better and earlier identification of the intrinsic properties of chemical substances. In the military sphere the Directive applies to gun propellants, explosives, jet fighter fuel and so on. Adhering to the Directive has a rather significant impact on the ability to strengthen the European military industrial base.

So the EU should seek an appropriate level of standardisation and always make a cost benefit analysis before introducing civil Directives in the area of military equipment.

Maintain a Strong European DTIB

In addition to reducing regulatory constraints, sustaining a strong European defence technological and industrial base is necessary in order to ensure Security of Supply, this includes:

- Maintaining industrial competence over time
- Sustaining a minimum level of efficient cooperative funded R&D investment.
- Promoting common cross border EU programmes. No single EU country can carry the cost of a large defence project, thus, common programs are necessary. It is important to create Centre’s of Excellence in different hubs around Europe, where long term competence build up may take place. To ensure common use of the technologies developed, it must be clear how Intellectual Property Rights (IPR) are managed. IPR could be owned by the EU, and thus, common export rules and regulations should apply for users of the IPR.
- Developing a policy for innovative SMEs and making sure they can get access to the defence and security market
- Encouraging multiple sources when affordable (SMEs) and the emergence of European champions when possible.
Conclusions

A defined level of Strategic Autonomy at European level is a prerequisite to ensuring Security of Supply. This means that European nations need to define the key competencies they want to maintain in Europe and consequently build a strong DTIB.

Due to the longevity of defence products, the regulatory framework of the EU defence market must support the enhanced business cases of both the customer and the contractor (endurance, reliability and maintainability).

The Concept of Operations and operational defence planning in EU countries must be better harmonised and in future, common defence capability planning must be fostered, to avoid focusing on products rather than solutions and capabilities. Thus, multiple military products serving a single purpose must be avoided in order to improve the efficiency of industry and ensure enhanced Security of Supply.

Conversely, the diversity of bi and multinational agreements/arrangements and the building of mutual dependencies between EU Member States, operating the same standards and principles of Security of Supply (e.g. performance criteria for procurement, export controls, supply chain management, intellectual property rights clauses, availability of spare parts throughout the life cycle of the weapon system) should be strengthened.

Furthermore, in order to address EU defense market interests and procurement regulations, the EU and its Member States may decide to concentrate efforts on specific key capabilities, such as air transport, air to air refueling, early warning and ISTAR, new generation of main battle tank, etc.

Last but not least, the European Union and its Member States need also to consider establishing a cooperative environment outside Europe in order ensure Security of Supply in the context of globalisation.
References


Committee 4

Time to market, fast changing and disruptive technologies: do we need new business models?

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Executive summary

Committee 4 was tasked with the pertinent issue of how to adopt new, fast changing and potentially disruptive technologies quickly, and whether new business models are needed to ensure that European and allied forces benefit from these developments through a faster time to market.

This paper focuses on the European defence industry and procurement agencies and how these can collaborate more effectively to deliver innovative, disruptive technologies faster to the armed forces.

The reason this issue is important is because non-conventional threats have become extremely complex and unpredictable. State and non-state actors using non-conventional technologies are a threat to Europe’s security and European interests. The most prominent non-conventional threats stem from terrorist attacks, use of weapons of mass destruction, and attacks in or through cyberspace. At the same time technology is available at an ever increasing rate to friend and foe.

Looking at best practices from inside and outside the defence industry, this paper finds that much can be improved significantly without creating an entirely new business model. Examples from SpaceX show how agile, lean and flat organisations with a bolder risk approach greatly benefited the company. Best practice examples from the Finnish navy show how a closer coupling of end-user and contractor vastly improved the end result. Other examples show how actively supporting European SME’s brings forward new relevant technologies faster.

Supporting these best practices within an effective legal framework as well as in integrated development and acquisition teams makes it possible to quickly field highly relevant capabilities without needing to completely reinvent business models.
Definitions

In addressing the question of Disruptive Technologies in the military environment, and whether or not new business models are required to shorten the time to market (or time to deployment), Committee Four found it useful to baseline an understanding of disruptive technologies, both in the commercial and the defence sectors. Equally, in a mixed group of defence and industry professionals, the Committee found definitions of time to market varied, depending on military and/or industry backgrounds, and decided to baseline a common definition for Time to Market (TTM).

Disruptive Technologies

A disruptive technology is one that, at its core, significantly alters the way businesses operate. Companies that fail to anticipate, manage, and account for the effects of a new disruptive technology will at best lose market share to companies that have been better able to integrate the technology into the way they do business, or, at worst, they may be forced out of the market.

For the defence sector, this means shifts in the organisational behaviour of both defence industry and military establishments are required if the full benefits of innovation are to be captured and integrated into defence capability for the battlefield. In the security domain and in the context of hybrid and asymmetric warfare, disruptive technologies pose a huge challenge to relatively slow-moving national defence organisations (NDO’s).

The application of emerging technologies creates, for example, the potential for affordable, interoperable, autonomous, and semi-autonomous systems that improve the effectiveness of soldiers and units. Future robotic technologies and unmanned ground systems (UGS) will augment soldiers’ unit capabilities by enhancing situational awareness, mobility, and lethality. Artificial intelligence enables the deployment of autonomous and semi-autonomous systems with the ability to learn, and allows the operators to make decisions safely, far removed from the battlefield. Robotics enable future forces by making them more effective across wider areas, contributing to force protection, and providing them increased capabilities to maintain superiority.

The impact of disruptive technologies in the defence domain is multi-faceted. Firstly, there is the military threat posed by rapid technical developments of the so-called “pacing competitors”, namely Russia and China which are investing heavily in advanced capabilities that threaten NATO military superiority. Separately, there is a competitive threat to European industry. The US Third Offset Strategy (TOS) focuses on leveraging the technological leaps of the civil commercial sector to enhance US defence capability – creating both a technical gap and interoperability issues with European forces, and a competitive challenge to European industry. Russia and China are developing lower cost advanced technologies which compete against higher cost European capabilities. As European companies seek to globalise and open new export markets, the Russian and Chinese competition is keenly felt.
"Time to market" is a concept that varies from the standpoint of the producer to the consumer, but typically spans the moment a product or service idea is conceived, to the time in which the product/service is launched, or made available to the market. Committee Four determined that the most relevant timeframe to consider in the defence environment must span the pre-concept phase to the delivery phase, as defined in the NATO AAP-20 standardized approach to lifecycle management. It is in this context that the Committee reviewed existing deficiencies as well as best practices in European procurement cycles, and has provided recommendations for improvements and in efficiencies.

This paper will focus on the need for European industry and procurement agencies to work together collaboratively to deliver innovative, disruptive technologies faster to the armed forces.
Time to market, fast changing and disruptive technologies: do we need new business models?

While the greatest militaries throughout history have relied on organisation, fortifications, strategy and sheer numeric superiority, technology has historically proved the discriminator in achieving battlespace supremacy. From gunpowder to radio communication, to military aircraft, radar and GPS, advances in conventional warfare technology, particularly in the United States and Europe, have made the difference. They have enabled force-multiplying lethality, while recent advances in precision technology have served to limit civilian casualties and damage to non-military targets.

It is the ability to rapidly field new technologies that has won battles and protected the lives of soldiers. The use of radar in the Battle of Britain is often cited as the technology which enabled the RAF to defeat the Luftwaffe, despite vast numerical odds. The rapid acquisition and deployment of MRAP vehicles to the Iraq and Afghanistan theatres is credited with saving thousands of lives and limbs, and enabling troop transports over hostile, IED territory. The rapidity in which a military can conceive, develop, source and field technologies can spell the difference between victory and defeat.

Current Security Environment

Today’s international security situation, both globally and in Europe’s immediate neighbourhood, has deteriorated over the past few years. We see a security environment that has changed fundamentally in a relatively short time. Future threats and risks are likely to become extremely complex and will impact European cohesion and the supremacy of Western states in international politics.
The most significant change in the European security environment is Russia’s growing military capability and willingness to use force. Military reform in Russia has led to investment and modernisation of Russia’s conventional forces and strengthening of its nuclear capabilities. The Russian annexation of Crimea in 2014 and ongoing destabilisation of Eastern Ukraine violates international law, greatly impacting European security. Russia has repeatedly proven itself willing to use a wide spectrum of measures, from media and political influence, economic warfare, and Denial of Service attacks to outright military force, in order to sustain its dominance and influence.

Europe also faces serious challenges related to developments in the Middle East, North Africa and the Sahel. Economic turmoil, corruption, terror, and violence constitute a real threat to international peace and security. The on-going armed conflicts in the region have caused massive humanitarian suffering, and a global refugee crisis.

State and non-state actors using non-conventional technologies are a threat to Europe’s security and European interests. The most prominent non-conventional threats stem from terrorist attacks, use of weapons of mass destruction, and attacks in or through cyberspace. The ease in which low-tech weapons are deployed requires the ability for industry and military planners to not only accurately predict the next deadly weapon, but to counter-deploy the right preventative technologies, at speed.

Current Technological trends

These proliferation of increasingly advanced weapons and technologies represents a dual challenge. On the one hand, they have an impact on our security environment. Such weapons and technologies have significant destructive potential, whether wielded by state or non-state actors. Long-range precision guided weapons cause significant damage to strategic targets with little or no warning. Modern air defence systems can deny access to critically important sections of air space. New capabilities in the cyber and space domains likewise create a new and dangerous environment where effective countermeasures are limited and attribution difficult. On the other hand, these technological advances have wide-reaching economic consequences. Countering technologically-driven threats requires continuous investments in development and modernisation. Since modern information and network technologies are mainly being developed in the civilian sector, adoption of these technologies will be key to militaries in the foreseeable future, particularly in network-based defences that modern forces are implementing.

The civil sector is spearheading development of unmanned systems, which will be of great significance in military operations. At present, remote-controlled satellites, aircraft, helicopters and ground vehicles are already mature and widespread in the military sector. These systems will grow in numbers, in capability and in autonomy.

Information and network technologies, precision-guided long-range missiles, hybrid warfare and unmanned systems all characterize the future of military power. Along with this, we see changes in concepts and doctrines, including new forms of hybrid warfare and denial strategies.
Current Impediments to Rapid Fielding of New Technologies

As shown, the implementation of new military products based on fast-moving and disruptive technologies bring incalculable benefits to the battlefield. However, the implementation of these new capabilities is hampered by a number of challenges across the acquisition spectrum from concept to delivery, which can delay, or in some cases prevent the delivery of new capabilities to the end users.

Nowadays in the post-cold war world of globalization and decreasing defence budgets, the business climate for the defence industry has changed. Traditionally it was the defence sector which enabled new, disruptive technologies. While defence companies and research organizations continue to invest and innovate in advanced capabilities, pole position is widely seen to be held by civil and commercial companies who invest heavily in energy storage, cloud computing, 3-D printing – the potential platform technologies for military disruptive capabilities.

A myriad of reasons exist to account for the challenges we see in technology implementation to armed forces. Among them we can include protracted procurement cycles. A review of functioning defence acquisition systems in selected countries indicate that there is no single, ideal system which would meet the expectations of all stakeholders. In many cases the main obstacles are: scattering of competencies across the institutions engaged in acquisition, drawn-out procedures to verify technical offers or the results of R&D projects, as well as imperfect prioritization of operational requirements. Above all, there is a need to ensure the interoperability of new capabilities with existing infrastructure which may act as a drag on developing radical new solutions.

Additionally, legal procedures of defence procurement are geared towards ensuring transparency and clarity and fairness in acquisition, and while crucial, they slow down procedures and delay delivery of much-needed capabilities to the users. Overly complex procurement procedures and the above-mentioned legal conditions and aspects are not only time-consuming, but they can create delays to such an extent that the capability, when finally implemented, is outdated and vulnerable to new enemy technologies - commercial technologies weaponised by combatants or capability leaps by allied forces which pose interoperability challenges.

Encouraging Agility in Technology Adaptation
What Works?

Introduction

In discussions and analyses, Committee Four addressed the central question of "Do we need new business models?" In doing so, the committee reviewed a number of procedures across the capability development spectra of European defence companies and agencies, as well as the civil sector, and identified a number of Best Practices.
In a fast-changing world where threat scenarios and technology trends develop day by day it is necessary to find inspiration from all corners of the world of technology to encourage greater agility in defining and adapting complex programs that stretch over years or even decades.

We see complex technology-leapfrogging in the private sector among both large and small enterprises, which vastly reduces cost and time to market. SpaceX, for example, has had significant success in reducing costs of space rockets by embracing a new and open mind-set in concept and development phases. Concept phases are now seen to include crowdsourcing techniques and so-called "global challenges", enabling innovative organizations to tap into truly global talent pools.

Risk is a natural part of any project and must be handled accordingly. Risk Management finds the balance between accepting risk and avoiding risk, knowing that extremes in either direction can be equally costly and ineffective.

**Scenario and Capability driven Approach**

This paper will highlight the benefits in bringing the end users into the concept and development processes to guarantee that capability gaps are truly met in the end. From the outset, the development of military capability for future battlefields can only stem from a diverse and broadminded approach to identifying the likely future threat scenarios. A scenario-driven approach addresses this.

Throughout the cold war, the security environment did not change rapidly, and it was possible to build incrementally on findings from end users, utilizing their inputs without reflecting on or preparing for a drastically changing environment. However, times change, and those changes are gathering speed and complexity. Conventional capabilities that have been incrementally developed from Cold War platforms no longer meet today’s threats and are unlikely to meet threats of the future.

In a Scenario Driven approach, end users work with a diverse team of experts (scientists, long-term capability planners) to consider the present as well as future potential wartime scenarios. As the future is sure to be uncertain, multiple pictures are drawn from current trend analyses, yielding various scenarios. Once the most probable scenarios are agreed, the right capabilities may be more accurately identified. This was and is done in nations like the US\(^{(2)}\), the UK\(^{(3)}\), as well as in organisations like NATO\(^{(4)}\) with a significant effort and in the EU in EDA\(^{(5)}\) to a lesser degree. It is an approach taken by innovative organizations in both the public and commercial sector. Additionally, the more agile organizations employ a Capability Driven Approach. They identify what capability is needed, and avoid an overly prescriptive solution definition. They entertain

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\(^{(2)}\) US National Intelligence Council; Global Trends 2030: Alternative Worlds; December 2012

\(^{(3)}\) UK Concepts and Doctrine Centre; Global Strategic Trends out to 2045; June 2014

\(^{(4)}\) NATO Allied Command for Transformation; Multiple Futures Project: Navigating towards 2030; April 2009

\(^{(5)}\) EDA; Future Trends to Scenarios; May 2013

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multiple and often varied solutions to deliver the required capability, and are not content to merely replace an obsolete system with an incrementally improved variant. A capability-driven approach complements the scenario-driven approach in that it opens the acquisition aperture to adopt new, effective and potentially disruptive technologies.

**Agile technology examples from the civil domain**

In the last decade, new multinational companies such as Google, Facebook, Tesla and SpaceX have taken traditional industries head on. Their rise has to a large extent been supported by new and disruptive capabilities in energy storage, high speed mobile connectivity and autonomous or near autonomous vehicle control. A key question for our committee lay in how the success of the commercial sector can inspire the defence community to bring breakthrough capabilities faster to the operational user.

In the pre-concept and concept phases of product development, a diverse and talented community mobilizes around an inspiring goal. We see an increasing popularity in the application of "global challenges", in which students worldwide are challenged to compete towards a common goal. Recent and exciting examples are the world solar challenge\(^6\), the hyperloop challenge from SpaceX\(^7\) or the SHELL eco-marathon\(^8\). The results of these challenges are manifold – near-term solutions to problems facing industry and/or society, the promotion of careers in research, development and engineering, and an enthusiastic pipeline of future engineers and technologists.

A flatter organisational model allows for a relatively faster transition from concept to the development phase. Once in development, these companies differentiate themselves by a bolder approach to risk, as compared to their more traditional peers. This is also reflected in the financial performance of such new initiatives. We may look to the example of SpaceX, which, despite several severe setbacks during development, managed to achieve extraordinary successes due to a long-term vision and a learn-from-failure ethos.

\(^6\) https://www.worldsolarchallenge.org/
\(^7\) http://www.spacex.com/hyperloop
\(^8\) http://www.shell.com/energy-and-innovation/shell-ecomarathon.html
Best Practice: Risk Management

To achieve the aims of a project, regardless whether a project is in procurement or R&D, the Project Manager (PM) has to get the uncertainties and risks linked to the objectives of the project under control. That means to firstly understand them (step 1 (Identify) of the RM-process, see Figure 0-2) and then to manage them professionally (step 2 – 4 of the RM-process).

It has been proven, that the Project Manager who applies Risk Management tools professionally from the outset of a project has a significantly higher chance of reaching milestones and finishing the project as planned according to the project charter, than those who either never started to apply the Risk Management process or did it too late.

Since risk management is dependent on organisational culture, (the application itself is relatively simple), projects which have had the full support of senior management in applying proper risk management were also statistically more successful. Especially R&D-projects, which are supposed to yield new or even disruptive technologies, were only successful when the company or organisation had a risk-taking attitude and a top-down supported flexible approach across the Programme Management disciplines.

For R&D projects a new business model is not required, but a strict and top-down led application of Risk Management must be mandated which supports:

✓ a risk-taking culture (a "nothing is impossible" philosophy, a risk appetite well above the normal threshold, involvement of all stakeholders) and
✓ a flexible and strict application of Programme Management disciplines (management of requirements, time, risk, quality and budgets must strictly be enforced, iterations of the processes and the decision-making must be embedded in an agile and lean structure and management)

and needs:
✓ the provision of a special fund (much higher than normal reserves) to cover the financial burden of these risks (contingencies and management reserves).

The first two recommendations are essential prerequisites for exploiting new, even radical ideas in R&D-projects. Point three above will ensure that management is not betting on their company by taking high risks. It must be possible to fail, and both risk-taking and failures must not jeopardise the company or the institute. Mitigating the risk that may jeopardise the
company or the institute (e.g. by a special fund or certain sponsorship), will ease the ability for
decision-makers in industry, universities, etc. to set up new R&D-projects. These projects will
have a much better chance of success, and yield new and innovative technologies to ensure
that our armed forces are supplied with weapon systems and equipment that give them an
advantage.

**Agility in Technology Adaptation: Utilization of SMEs**

The significant contribution of SMEs to innovation across sectors is widely recognized. This is
equally the case in the defence industry where governments, large companies and end-users
are aware of their potential benefit to the mission of developing and enabling advanced military
capability.

SMEs are often in the forefront of research and development, exploiting new technologies
and gaining competitive advantages. For large defence companies, partnering with SMEs can
provide a strategic development opportunity, particularly in the areas of:

- **Disruptive Technologies** (50% of patents related to new technologies are recorded by SMEs)
- **Agility and Culture of innovation** (high reactivity in development phase for prototyping,
  acceptance of failure, risk taking)
- **Added value and Competitiveness** (challenging the status quo)

Several initiatives exist in France to encourage involvement of SMEs in the defence sector. The Pact Defence PME (SME) proposes a global strategy for the Ministry of Defence in favour
of small and medium-sized enterprises in the areas of acquisition and support of equipment.
It aims to address some of the major hurdles that smaller enterprises face: access to new
markets, innovation, export financing and subcontracting. The "Pacte Defense PME strategy
focuses on supporting innovation articulated around 3 axes Rely and develop "Rapid" initiative,
Increase maturity of technology, allow SME products to be certified and labelled as be labelled
"DGA Tested". The government has called on major defence industry players to support the
Pact Defence initiative by establishing relationships with SMEs.

In the same way, the UK Ministry of Defence recognizes that a significant percentage of civil
sector technology originates in SMEs, start-ups and universities, and is increasingly looking to
employ dual-use technologies, to leverage and take advantage of civil sector funding streams.

Industry also benefits from and depends on the innovative capabilities within the SME sector.
In 2015, MBDA implemented the E3 project initiative to ensure the viability and competitiveness
of its future supply chain. The initiative seeks to:

- **Look outside the defence sector for cutting edge technology (Open Innovation),**
- **Ensure that partner SMEs have a sustainable business / commercial structure**
- **Establish and promote an entrepreneurial attitude within large companies, linking defence
  with commercial capabilities.**
Unfortunately, all these initiatives are only taken at national and not at multinational level to preserve national industry interest.

**Best Practice: Increased Efficiencies in Finnish Procurement Model**

Finnish Defence Forces’ Research Director Col. (Eng) Jyri Kosola recently discussed the Finnish Defence Force’s research activities, observing the long development time of new military capabilities from concept to operational readiness. His conclusion was that it takes up to 30 years before emerging technologies are available as operational systems. If we limit the perspective to procurement of capability, the time frame covers approximately 12 years. Traditionally Finnish Defence Forces’ development and procurement programs are based on the widely used waterfall model. Each step of the model must be completely finished before the program proceeds to next phase. This means a considerable number of design and verification reviews and acceptances is needed throughout the program and development work stops at each review point to wait for its outcome. See below:
Both the Finnish Defence Forces and Finnish industry have recognised the bottlenecks inherent in this model, which cause delays in project execution. Some efforts have been made to improve the situation, two of which are described below.

**Example 1: Iterative Development**

The Finnish Navy recently contracted industry to develop a new lightweight underwater surveillance system. Both the customer and contractor recognised the challenges built into the traditional development model. As a result, the parties decided to employ an iterative development model. The development process was inclusive, involving the contractor’s project team, customer’s project team and a considerable number of future end users. After system delivery, the efficiency of the iterative development model was evaluated. The evaluators concluded that whilst the development time was in fact about the same as with the waterfall method, the system usability was much better due to the combined involvement of operators in the design process and implementation of their ideas throughout the process. On the other hand, customer participants had to devote a reasonably large part of their work hours to the process.

**Example 2: Integrated Project Teams**

A second example considers the ongoing mid-life upgrade program of Finnish Navy Hamina-class PGG’s (Squadron 2000 MLU). For this program, the Finnish Defence Forces Logistics Command decided to employ a new approach. The first RFQ considered only the selection of the program prime contractor. The selection process assessed the participating companies’ capability to carry out the program but did not involve technical solutions, system selection or the prime’s supplier network. As a result of competition, the Logistics Command selected a single prime candidate, but did not sign a procurement contract at this stage. Logistics command’s project team and prime candidate’s project team now came together to form an Integrated Project Team (IPT) that has jointly formulated technical, ILS and management requirements for the RFQ that has been sent to potential suppliers. The performance and operational requirements remain in the hands of the customer and project management practices remain in the hands of prime candidate.

Final quotations from system suppliers are due soon and when they have been received the IPT will select the systems to be used in the program. After system selection and price negotiations, Logistics Command will conclude a contract with the prime, and the prime will sign its own contracts with suppliers.
The customer’s goal in both of the examples above is to have better visibility and control over the program implementation, and to ensure that required performance is delivered on time and in one go, with a reduced risk level. The key issue is the customer’s participation in the program, and willingness to work together with the contractor in an Integrated Project Teams.

**Conclusion & Recommendations**

As mentioned above, since there are significant differences within the processes countries and institutions have in use, Committee Four uses the standardized approach for managing collaborative programmes, as defined in NATO’s Allied Publication 20 (AAP-20).

The findings of the research of the chapters above were set against this model. Finally, the committee addressed the question of whether or not a new business or acquisition model was needed.

In view of national and NATO/EU-wide experience with acquisitions, our conclusion is that an entirely new model is not needed to improve time to market or to successfully implement fast changing and disruptive technologies. It is judged sufficient to look across European industry and defence procurement agencies to identify and encourage the dissemination of best practices in rapid deployment of new technologies.

In order to do that, a series of recommendations should be taken into account in order to increase the abilities of European militaries to quickly field disruptive technologies:
General and overall recommendations

Through proper risk management, engender a risk-taking culture to increase the chances of discovering disruptive technologies within research and development programmes.

Support a flexible application of Programme Management: iterations of the processes and a multi-stage decision-making must be imbedded in an agile and lean structure.

Provide a special fund (much higher than normal reserves) to cover for the financial burden of these risks (contingencies and management reserves), particularly for SMEs.

Develop a culture of use of existing civil disruptive technologies and innovations for military applications.

Speed up processes within the legal framework of defence acquisition to avoid obsolescence of newly fielded capabilities.

Unify and synchronize efforts across the development and acquisition cycles of European Nations and its allies to avoid duplications and save costs.

Strengthen the SMEs and encourage their involvement in defence programmes via partnerships with big industrial players, or directly with the governments.

Use a scenario-driven approach to identify those capabilities that armed forces will need in the future, and to avoid solving the problems of yesterday.

Use a capability-driven approach to define the capabilities – not systems – that fill the capability gaps derived from consideration of multiple future scenarios in a scenario driven approach.

Cultivate an overview of relevant industrial players – primes as well as SMEs – to be in the position to address the right industry partners in due course.

Work with integrated development and procurement teams including end users, industry, legal, contracting, scenario, capability, R&D and armament experts.

Support European integration on the industrial side as well as on the governmental side.

Make use of Technology Insertion to maintain or improve the performance of products already in use and Support activities like ‘innovation tunnel’ to get the best solutions for your needs.
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E3 Project Briefing_UK R&T WG 20170201
Committee 5

Challenges and possibilities of extra-european cooperation

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Executive summary

SERA 29 committee 5 addresses the issue of "Extra European Military Cooperation" by exploring the possibilities (pros & cons) for military cooperation between Europe and other countries or organizations. By using a metaphor of a "Drink-Cocktail", the original European countries can be seen as the existing ingredients, and the general question asked would then be: what would a "new" ingredient do to the cocktail? Will, or can it, make it more interesting, stable, or spicy? This paper is structured to address those questions.

Over the decades, European cooperation could be described as somewhat of a multicultural cocktail of national interests, aspirations, initiatives and a common endeavour for the continent through peace and cooperation. Still, European Union member's states have been quite cautious if not reluctant to develop and promote a unified Foreign Affairs policy and leadership as well as a common Defence and Armament Policy. This chapter in the SERA 29 report will explore the challenges and possibilities of extra-European cooperation aimed at complementing and revitalising existing European collaboration in the field of security policy and defence, and defence industry cooperation. Existing partnerships like the one with the North Atlantic Treaty Organisation (NATO) and the transatlantic link with the United States will be analysed as well as completely new relationships with India and China. Can Europe and the European Union (EU) survive without a new and refreshing boost to the cocktail?

NATO is currently an integral part of European cooperation in Defence. The new impetus in EU – NATO cooperation should take place in the spirit of full openness and in full respect of the decision making autonomy and procedures of both organisations, based on the principle of inclusiveness, and will be without prejudice to the specific character of the security and defence policy of each member state. Should European countries decide to reinforce their cooperation in Defence and diplomacy in the framework of the European Union, then the EU should need to find its own role and representation in NATO. A stronger European Union in Defence will be the best guarantee of a reinforced and stronger NATO, contributing to rebalance efforts and investments between both sides of the Atlantic. After BREXIT, the UK could play an important role as a bridge between Europe and the United States.

NATO being the axis of the Transatlantic-link and the founding stone of Defence cooperation between the US and the European Countries, and taking into consideration the rapid evolution of threats and the security global framework, we can conclude that the United States needs its alliances more than ever. Therefore, we should expect that any elected administration will honour principles accumulated over decades. United States also values European cooperation as it makes Europe stronger and, as proxy prepared to defend US interests in Europe towards Russia and the south-east border of EU. However the bilateral approach towards European states one-on-one may unintentionally create disruptive relationships in the EU – leading to less fruitful defence procurement cooperation on the European continent in the next couple of years. In this respect, F35 JSF program is a good example of a "US led competitive collaboration program" with 5 EU Nations (UK, Italy, Netherlands, Denmark, Norway plus Turkey) involved and cooperating but under US leadership and governance outside NATO. As a whole, the relationship
is stable but fluctuations occur over time. Recent developments during the spring of 2017 have to be closely monitored, as do the declarations at the NATO Summit of May 2017.

In order to discuss the present restrictions in EU Military Export and Armament cooperation (focus on non-lethal or non-expeditionary technologies), two important factors are to be met.

Firstly, the Chinese "Gentle Neighborhood" policy to the East and the "New Silk Road" to the West have to pay their dividends in gaining USA, EU and immediate neighbour’s acceptance and support by letting China play a regional stabilization role, and finding a modus vivendi on on-going tensions on disputed EEZ, reefs, islands and straits. Secondly, finding a new balance of power and responsibilities in region with the USA will be key given their interests and alliance networks.

Extra European cooperation with China provides a chance to produce significant benefits from a political, military and industrial perspective. It will need more time to develop and will produce its benefits only under a long-term perspective. EU is already trying to enhance cooperation with China as shown through the "negotiations of a comprehensive EU-China Investment Agreement". Furthermore, China and the EU have to gain a better mutual understanding of each other’s security interests, including the security interests of allies.

Mastering these main hurdles, and provided a continuous Confidence Building agenda is developed, Extra-European Cooperation with China can provide valuable benefits to the EU and its Nations.

Secondly, building on already existing partnership arrangements between the EU and India is worthwhile for European countries, to further investigate and deepen possible areas for a more strategic cooperation. A step by step approach on technical and operational level is recommended in order to use strengths and reduce weaknesses. In this respect, the German/Indian working group could be seen as a role model, on a wider European level, to facilitate a dialogue between partners of different organisations in Europe and India. However, to establish a more strategic approach, it is crucial to institutionalise such dialogue by associating European defence associations with their Indian counterparts.

After having studied several additional ingredients to the current European cocktail of cooperation, a picture emerges of possible revitalization of the Defence cooperation between Europe and third parties. With the European Union as a stronger international player in Defence and Security, representing all the Member States together, we could envisage mainly positive effects, but also new dependencies with new actors that needs to be scrutinized from a security policy perspective. As discussed, extra-European cooperation can have a positive effect on safety and stability (building alliances and interdependencies). Secondly, joint armament programs can result in better alignment in capabilities and better focus in R&D efforts.
Extra European Co-operation

Introduction

European cooperation has always been a multicultural cocktail of national interests, aspirations, initiatives and a common endeavour for the continent through peace and cooperation. As we are to explore the challenges and possibilities of extra-European cooperation – what better way than to see the existing European collaboration as a cocktail and the new emerging partners and cooperation’s as new ingredients to the mixture. Existing partnerships like the one with the North Atlantic Treaty Organisation (NATO) and the transatlantic link with the United States of America (USA) can be seen as external substances that, like in the case of the USA, may have altered the cocktail taste in recent months. How will all those new flavours alter the original taste? Is it wise to include them? Can Europe and the European Union (EU) survive without a new and refreshing boost to the cocktail?

Over the past several years the EU has made important steps to strengthen its strategic partnerships with different partners and to address multiple challenges connected with this cooperation\(^1\). On the one hand, the EU as a whole needs a more complex and more advanced set of capabilities to confront the current threats and challenges to its security. On the other hand, the latest technological trends and rising competition from other regions are weakening European leadership in Research and Technology and Research and Development and weapons production and supply. Slowly but steadily there are new stakeholders emerging on the defence market, such as India, China, Arab states and the like, which are becoming more and more potent and they will undeniably confront European supremacy in this particular domain.

In line with current European strategies, especially the newly adopted EU Global Strategy, the EU as a whole needs to make an accurate assessment of possible channels and fields of cooperation with outside partners to increase defence cooperation. There exists a pressing need for the EU to go beyond its traditional ways of cooperation and propose new schemes, which will allow it to strengthen ties with the most prospective partners in the areas of common procurement, developing armaments programs, and research on cutting-edge technologies.

Security Environment

As mentioned in the Global Strategy for the European Union’s Foreign and Security Policy\(^2\):

- "We live in times of existential crisis, within and beyond the European Union".
- "The European Union will promote peace and guarantee the security of its citizens and territory", promoting "rules-based global order".

\(^1\) EDA, 2008
"In a more contested world, the EU will be guided by a strong sense of responsibility" 

"In a more connected world, the EU will engage with others" and "will manage interdependence, with all the opportunities, challenges and fears it brings about, by engaging the wider world".

Our analysis is centered in this last point of the relations of the EU with third parties on security and defense issues. The EU is proposing an integrated approach to conflicts, because none of them can be solved by one Country or even by the EU alone. Comprehensive agreements, based on regional and international partnerships are necessary. European Union is considering the support of cooperative regional orders worldwide: in Europe; in the Mediterranean, Middle East and Africa; across the Atlantic; in Asia; and in the Arctic.

When considering defense issues in Europe, and across the Atlantic, NATO remains the main actor and the EU has taken this into account reinforcing the links with the Alliance. The NATO Warsaw Summit, in 2016, was designed and intended to demonstrate NATO’s renewed commitment on deterrence and defence, and the strengthening of its capabilities to meet three principal security challenges:

1. the fragile relationship with Russia and deep unease among East European allies following the annexation of Crimea and Russian intervention in eastern Ukraine;
2. the insecurity in and beyond the Mediterranean, mirrored in the refugee/migrant crisis, continuing conflict in the Middle East, North Africa, the Gulf and Afghanistan and the export of Islamic State terrorism to NATO states; and
3. rising tensions in the Asia Pacific that accompany growing territorial disputes over strategic and energy resources in the East and South China Seas, North Korean nuclear aggressive posture, and increasingly nationalist discourses as 1938-1945 events are still very sensitive topics in North East Asia public opinions.

The Summit was also establishing the basis for an enhanced cooperation between NATO and the EU, particularly in intelligence-sharing, cyber security cooperation, counter-terrorism, maritime security and in responding to the challenges of hybrid warfare. As mentioned in the Global Strategy of the EU, "European security and defence efforts should enable the EU to act autonomously while also contributing to and undertaking actions in cooperation with NATO".

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(5) Joint Declaration by the President of the European Council the President of the European Commission and the Secretary General of the North Atlantic Treaty Organization. 8 July 2016
Defence Cooperation

International defence cooperation takes many forms and therefore needs to be defined\(^6\). At a strategic level, a distinction can first of all be made between bilateral and multilateral forms of defence cooperation. Multilateral cooperation is mainly performed within military alliances like NATO or in the framework of the United Nations. Now that the European Union is becoming an actor in Defence, multilateral cooperation could be also seen among all the European Member States and other countries, like China or India. The multilateral cooperation between the European Union and third parties will be the subject of our analysis as compared to the bilateral cooperation’s driven currently by the EU Member States.

At the strategic level a distinction is also made between top-down and bottom-up approaches to international defence cooperation. At the time of the Cold War, NATO was an alliance that relied on top-down military planning and integrated cooperation to defend its external borders.

Defence cooperation could be driven at three different levels: political, military and industrial cooperation. EU has been central up to know in the political aspect, but it is assuming a new role in military and industrial issues. According to its Global Strategy, “to engage responsibly with the world, credibility is essential. In this fragile world, soft power is not enough”

One of the key issues in investigating the scope for international defence cooperation is national sovereignty.\(^7\) Sovereignty is often seen as an obstacle to cooperation, certainly in the politically sensitive area of defence and national security. Indeed, in an era of ongoing globalisation, bilateral and multilateral cooperation are actually a way of retaining as much international presence and influence as possible in military and security matters.

New approach to multinational armaments cooperation

Armament cooperation is based on the assessment that increasing development costs and low national order volumes will be unsustainable in the long run. Germany has proposed\(^8\) one possible model of armament cooperation at European level that could be extrapolated to third parties cooperation. The proposal in essence boils down to four elements:

- Harmonised capability requirements to enable one standardised design rather than multiple national versions that drive up prices and prevent interoperability.
- A lead-nation approach, in which one country facilitates the necessary harmonisation and then manages the project, instead of complex multinational governance structures that increase the transaction costs of coordination.
- Production based on technological and industrial excellence, rather than on the purchase of production share, to avoid financing industrial overcapacity.

\(^6\) Van Staden, A., et al., 2012
\(^7\) Giegerich, B.B., 2016
\(^8\) Ibidem
Rolling out cooperation across the life-cycle of equipment; from development and procurement, to maintenance, repair and operational support, given that buying a piece of kit is usually the smaller share of the overall cost. Harmonised capability requirements (9) are only possible if armed forces accept ‘good enough’ solutions rather than push for perfection and customisation according to national needs. It means every partner agreeing that for example a helicopter needs a winch but refraining from specifying different maximum loads. The next challenge would be to freeze the design once agreement on requirements has been reached.

The lead-nation idea can only work if cooperative nations re-discover the long-lost secret of effective multilateralism: one partner has to carry a disproportionate share of the burden in order for all to enjoy the benefits of their cooperation.

As a substantial increase in defence budgets over the committed 2% of GDP is unlikely in the near future, there is only one alternative:

- ✓ eliminate military surpluses within Europe wherever possible;
- ✓ arrange for joint procurement and maintenance of material;
- ✓ establish joint training courses;
- ✓ pool and share existing military capabilities with other countries to maximise use; and
- ✓ exchange and allocate capabilities in the context of operational cooperation (specialisation).

Fostering Extra European Union Defence and Armament cooperation can therefore be an additional lever to get more affordable Defence and Security capabilities, while building more cooperation and interdependencies outside the European Union.

**Definitions and Methodology**

**Definitions**

In this paper, Extra-European cooperation encompasses cooperation of the European Union as an entity (not as a particular Member State) with other countries and organisations in different regions, with the aim to align military policies. This can be at a strategic, tactical and operational level, depending on the target and implementation level of the cooperation.(10)

Defence cooperation can have a positive effect on safety and stability (building alliances) both in Europe, in the region of the partner and in the global world. Joint armament programs could be a key tool for military cooperation and can also result in better alignment in capabilities and better focus in R&D efforts.

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(9) Van Staden, A. et al., 2012

Cooperation should lead to strengthening the European Defence technological and industrial base, depending on the specific programme, cooperation can have short, medium and long-term effects. Alignments in R&D funds can have short-term effects, because specialization becomes possible: "more bang for the buck". In the long(er) term joint build and maintenance programs can be rolled out.

**Methodology**

The analysis has been carried out according to the SWOT assessment criteria relating to Strengths, Weaknesses, Opportunities and Threats. The SWOT analysis supported the identification of challenges (Threats) and possibilities (Opportunities) for the achievement of an effective and efficient defence cooperation (desired end-state).

For the purpose of this analysis extra-European partners have been clustered in four groups, representing the major bilateral and multilateral relations of the EU:

- International organisations like NATO or United Nations
- Transatlantic countries like USA or Canada
- Non-allied powers like China or Russia
- Emerging countries like India, Brazil, Indonesia, and Malaysia.

In order to maintain the overview, one representative country or organisation has been selected for each of the previous mentioned clusters:

- NATO;
- USA;
- China;
- India.

Taking into consideration the current complexity of the relations with Russia and the many possible evolutions of the current scenario we have decided to exclude Russia in our analysis because it will need a stand-alone analysis.

**NATO – The Familiar Ingredient**

Whereas NATO has been and currently remains the main pillar of European common Defence, the EU is increasingly playing a more relevant role in security issues. The end state of the EU Global Strategy of June 28 2016 is to maintain a stable and secure environment within and outside the European Union. In order to achieve this objective, the European Union is to play a more active "role" in the prevention and management of international crises.
European Union and NATO are working together for the solution of security crisis in the borders of Europe. Both organizations complement each other, as Europe play the role of a Soft Power, centred in Humanitarian Aid and Security reinforcement (Police and armed Force training level), whereas NATO role is more in the pure military field, protecting the European deployment of Humanitarian Aid.

For the foregoing, on July 8 2016, the EU and NATO signed in Warsaw a joint declaration that gave impetus to the cooperation between the two organisations in the following priority areas\(^{(1)}\):

- Hybrid threats;
- Strengthened maritime security cooperation through capacity building;
- Cyber security and strategic communications;
- Defence capabilities;
- Coordinated EU – NATO Exercises.

\(^{(1)}\) Council Conclusions on the Implementation of the Joint Declaration by the President of the European Council, the President of the European Commission and the Secretary General of the North Atlantic Treaty Organization. Ref. 15283/16 CFSP/PESC 1004 CSDP/PSDC 699 COPS 378 POLMIL 147 EUMC 146. Brussels, 6 December 2016
### Analysis

Most of the Countries of the European Union also are allied within the NATO framework and the ones that are not, Austria, Cyprus, Finland, Ireland, Malta and Sweden, maintain a strong relation of cooperation with NATO. This is also the case for EC about European NATO Countries which are not members of the EU: Albania, Iceland and Norway. As an example of these strong links, Norway has participated since the beginning in the Preparatory Action for Defence, launched by the EC in 2017. We can envisage that UK will follow a similar way after Brexit, remaining a full contributor and partner to the future efforts for Defence Cooperation in Europe, both in the field of R&D and Capability Development and Acquisition.

From a political strategic view, the current relation between NATO and EU is closely linked with the bilateral relation between EEUU and the European Union. The announced US intention to withdraw from the European security issues, jointly with BREXIT creates the conditions for the establishment of a "European pillar" within NATO. BREXIT has not adversely affected the relationship between the two organisations. Indeed, it may have helped strengthen them.

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(12) Europe, the rise of Asia and the future of the transatlantic relationship. Author: Luis Simón. The Royal Institute of International Affairs. Published by John Wiley & Sons. May 2015
From a strategic military standpoint, the June 28 2016 European Council, while keeping in mind the common objectives and values of the two organizations, calls for a strengthening of relations between the EU and NATO in areas of common interest. The strategic autonomy invoked by the EU Global Strategy cannot ignore the search for synergies with NATO on issues like interoperability, optimization of logistics and life cycle costs and alignment of R&D and capability development investments.

In this framework, the sharing of information between the two organisations will be particularly important for a joint review of the European Defence Agency Capability Development Plan (CDP) and the NATO Defence Planning Process.

From the technological and industrial point of view, the European Union has a limited experience in Defence and this is, at the same time a weaknesses and an opportunity for cooperation with NATO. The Alliance has all the knowledge needed by Europe and Europe is stabilising the mechanism to rationalise and boost defence technology developments in Europe, contributing to an increased effort of European Countries for the goal of common Defence in NATO.

The European Defence Research Programme, envisaged to be launched in 2020, after a successful Preparatory Action, could play a relevant role in order to prepare European industry for the development of new NATO Capabilities, like Ballistic Missile Defence or the future Allied Future Surveillance and Control Programme (AFSC), intended to develop the substitute of the current AWACS.

The Capability Window concept, launched by the EC, within the European Defence Action Plan published in 2017, could also play a fundamental role in order to increase the expenditure of European Countries in Defence, with a better return on investment, taking into consideration the rationalisation process of the Defence demand and offer in Europe. In this sense, the Capability Window should become the best way to solve the 2% Pledge in NATO, contributing to equilibrate the Defence effort in NATO as requested increasingly by the United States Administration.

Nevertheless, NATO is an alliance of States, focused in cooperation for Defence at military and diplomatic level. In this framework, the European Union, which even with an increased diplomatic power delegated from its Member States, is not a State and has not Armed Forces on their own need to find the right place and role to play within the complex machinery of NATO.

Possible conflicts among members of EU and NATO could be also at the same time a source of problems and an opportunity for exploiting the mediation capabilities of the EU. A good example could be the conflict between Cyprus and Turkey. Being Cyprus of European culture although belonging to Middle Eastern geographical dynamics, is yet again a strategic pinpoint. British and French bombers take off to strike the Islamic State between Syria and Iraq, both from the sovereign base of Paphos and from the permanent UK military bases of Akrotiri and Dhekelia in the south. Since 2015, Russia signed an agreement with Cyprus to access its ports with its military ships. From the European Union point of view (participating to the talks with the status of observer), solving of the Cyprus question would pave the way to an effective cooperation
with NATO, still unwelcome in Russia and blocked by Ankara. Since reunification would make Cyprus a likely hub for the transit of Mediterranean gas to Europe (reducing the EU’s energy dependence on Russia), Moscow would prefer, for geopolitical and energetic reasons, that the Green Line controlled by the blue helmets continue to divide Nicosia thus separating Cypriots.

Conclusions

The new impetus in EU – NATO cooperation will take place in the spirit of full openness and in full respect of the decision-making autonomy and procedures of both organisations, will be based on the principle of inclusiveness, and will be without prejudice to the specific character of the security and defence policy of each member state.

Taking into account the new impetus of the EU in Defence, the current cooperation scheme with NATO, based in the complementary roles of EU as a soft power and NATO as the hard partner, will give place, step by step, to a more equilibrated partnership with the EU acting more and more as a hard power.

Should European countries decide to reinforce their cooperation in Defence and Diplomacy within the framework of the EU, then Europe should need to find its own role and representation in NATO, as an organization of Member States, this being one of the most relevant open issues for the future cooperation.

After BREXIT, we are facing two political-strategic pillars within NATO, a "European" one and a "North Atlantic - Anglo-Saxon one." In this framework UK, which is traditionally and culturally closer to the United States, but geographically and historically linked to Europe, will play an important role in mediating between the EU and NATO.

Transatlantic Link

Another way of influencing the European cooperation and current state of affairs is to alter, augment, reinforce or discontinue the use of an already established relationship or in the context of our metaphor – reagent or agent to the existing cocktail. The transatlantic link or the US – European relationship in its current form has been around since the end of the Second World War. With the evolution of the European Union and agencies like the Western European Union (WEU) as well as changes in US foreign policy with new elected administrations over the decades, intensity of cooperation and exact heading and course have changed, but the foundation of cooperation and the transatlantic link has been fairly stable. (13)(14)

With the Donald Trump administration in the White House as of January 2017 there has been some signals regarding a new approach to European countries and organizations like EU, NATO etc. The analysis in this paper will revolve around how extensive changes in the relationship might occur over time, what the effects might be and what Europe as a whole might do to develop challenges into possibilities – fruitful for both parties either side of the Atlantic.

It is in the light of this that the US-European transatlantic relationship must be seen and what the changes of the US Administration, taking over the helm as of January 2017, could implicate.
To elaborate more on the different parts of the SWOT diagram, we evolve the statements.

The most obvious Strengths are:

✓ Europe and the United States have a long standing relationship! They share some common roots. The relationship between the two continents can be defined as "strong and steady". It forms a solid base for further military cooperation.
✓ This relationship over years resulted in common practices and cooperative actions regarding research, development, production and use (operations) of military equipment.
✓ Due to these cooperation’s the mutual trust and understanding can be addressed as high. Mutual understanding and trust are key elements for productive cooperation.
✓ Both partners have established ways and access to market.

Weaknesses seen by us:

✓ A more or less divided Europe in comparison of the United States forms a weakness in terms of negotiation equality: the weakness of "Divide and conquer". The more integrated and aligned policies of the federal United States Government over Europe leads to this remark.
✓ The size difference in defence budget is extreme. This can form a challenge in terms of balancing (financial) a cooperative program. The (in) dependencies can also lead to the situation where "one needs the other more than vice versa".
✓ The ITAR regulations cause "one direction" regulations witch lead to unbalanced export possibilities.

Opportunities feasible in near time:

✓ The "two window" approach in the EDAP (European Defence Action Plan) for research and capability could be exported in a "transatlantic version". Despite the enormous budget differences the United States can (and possible will) be interested in sharing research and capability insights.
✓ These insights can lead to cross Atlantic "alignment" in capabilities.
✓ The recent (repeated) call on NATO partners to raise defence budgets up to 2% BNP can be a driver in the development of cooperative programs (internal EU and external possibilities).

Foreseeable threats are:

✓ In some publications, it has been stated that the current century will be marked as the "century of Asia". This can lead to a shift in relevance for transatlantic cooperation.
✓ The current political climate in the United States shifts to more protectionism: statements like "America First" are pointing in that direction.
✓ This new insight on US foreign trade policy the US position has always been that of a "frontrunner". This can cause problems in sharing burdens and challenges in R&D and capabilities.
Besides the situation in the United States and BREXIT, lack of resolve, handling several crises in recent times, like huge refugee waves, has led to growing overall scepticism to EU’s abilities to act as one coherent organization.

Analysis

Very few indicators point to the fact that US-European relationship will change into something very different and thereby change the European cooperation into something unrecognizable. On the contrary – the relationship has proven stable over decades in all aspects – political, economic (trade) and military. However, during the reign of the current administration in Washington we are about to see some up until now not seen new policies that might be seen as a new ingredient to the cocktail and thereby change the taste sensation of the relationship to Europe as a whole and respective European countries.

Among the more noticeable effects of the new Washington administration is the swing towards a more stark business approach to world affairs, demonstrated by shift towards bilateralism instead of multilateralism. Confirmed in interviews with experts on US-European Relationship, Francois Heisbourg\(^\text{(15)}\), special advisor, Foundation pour la Recherche Stratégique in Paris, and Dr Mike Winnerstig\(^\text{(16)}\), FOI, Swedish Defence Research Agency, Expert on NATO, US and the Transatlantic Link. Both put forward the idea that President Trump, and his administration is guided by a "businessman-view" influencing their decisions – Geo-Poetically, military and of course Industry/trade – wise.

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\(^{15}\) Interview with Francois Heisbourg, Special advisor, Fondation pour la Recherche Stratégique in Paris, conducted March 6, Stockholm at thinktank Timbro

\(^{16}\) Interview with Mike Winnerstig, FOI, Swedish Defence Research Agency, Expert on NATO, US and the Transatlantic Link, Conducted FOI HQ, Kista, Stockholm
From a military standpoint, already at the beginning of 2017 we see a much more categorical and harsh US attitude regarding NATO member countries that do not live up to the 2% of GDP goal on National Defence Budget.

From a political and trade-economic standpoint we definitely can find the aforementioned shift to bilateral trade and political agreement and relationship, model – as opposed to the Multilateral model – in favour up until now. There are clear signs, comments Mr Heisbourg in his speech in Stockholm March 6 of 2017, that Trump administration values one-on-one negotiations.

In economic theory we have well established concept of Comparative Advantage, as described in the volume Political Economy (1985) by Nobel Prize laureate Edmund Phelps\(^{(17)}\), where trade and cooperation between nations can flourish by specialisation, communication and trade. Taken to a multi-relationship level a union like the European Union can draw great benefits from a multi-node constellation – involving the transatlantic link (US).

Multi-node agreements and cooperation of this sort will still be present but by putting future emphasis on one-on-one agreements with countries, the US administration, according to Mr Heisbourg, will try to get more efficiency out of every agreement on a bilateral basis – for the greater good. This perspective resembles more the concept of a zero-sum-game. Turning to economic theory and political economy (Phelps, 1988) Pareto-efficient solutions can be obtained in the one-on-one agreements, but this does not say anything about the outcome on aggregated level. What easily can play out under these circumstances is a sub-optimal situation for a multi-node constellation like the European establishment. In theory, a plethora of bilateral agreements back and forth in a web of connections could be nearly as efficient as a comprehensive multilateral framework. Efficiency measured in only fiscal terms is one thing.


Figure 6: Prisoners dilemma
When measurements include trust and flexibility our conclusion is that the new US approach will bring some disruptive qualities to the intra-European cooperation replicated through the system of relationships and agreements.

Conclusions


According to him, The US needs its alliances. Therefore any administration will honour principles accumulated over decades. United States also values European cooperation as it makes Europe stronger and as proxy prepared to defend US interests in Europe towards Russia and the south-east border of EU. However the bilateral approach towards European states one-on-one may unintentionally create disruptive relationships in the EU – leading to less fruitful defence procurement cooperation on the European continent.

China – the Energy Boost to the Cocktail

A very powerful way to Extra European cooperation could be to add some form of energy drink, and to stay with the picture of the cocktail could be a closer cooperation with non-allied powers such as Russia or China. Obviously this kind of Extra Cooperation needs more time to develop and could produce its benefits only under a long-term perspective. Nevertheless the potential effects shown in our SWOT-Analysis cover a wide range, from superhero-mode/ (universal peace) to cardiac dysrhythmia.

Due to the current political situation, Russia will not be considered as a cooperation partner until normalization occurs. Ukraine-Crimea crisis and the subsequent sanctions regime applied by EU and Allies on Russia has put on hold the momentum of the NATO - Russia cooperation initiated by 1997 NATO-Russia Founding Act.

China is the second largest economy and also the world’s biggest trading nation. Trade between the EU and China has increased over the last decades, reaching more than €1 billion a day with a significant EU trade deficit mainly due restrictive access to China’s public procurement market. Main problems are a lack of transparency, a strong degree of government intervention in the economy and an inadequate protection and enforcement of intellectual property rights. The reduction of these barriers for fairer trade is a clear aim for the EU. In 2013, the

(21) http://www.nato.int/cps/en/natolive/topics_50090.htm
16th EU-China Summit launched the negotiations of a comprehensive EU-China Investment Agreement. Objectives are the reduction of barriers for investment and the establishment of a more secure legal framework to investors on both sides. (23)

China is also an increasingly important military and diplomatic power. In 2016 China spent about $215 billion on Defence, which makes them second in defence spending after the United States (24). The white paper on Chinese Defence Policy (China’s National Defence in 2010) (25) specifies four goals and tasks of China’s national defence policy:

✓ Safeguarding national sovereignty, security and interests of national development, with a main focus on cross-strait relations,
✓ Maintaining social harmony and stability,
✓ Accelerating the modernisation of national defence and the armed forces,
✓ Maintaining world peace and stability.

Worth noting is the second priority, maintaining social harmony and stability, which reflects the special role given to People Liberation Army (PLA) in China politics still formally under the direct control of the ruling Chinese Communist Party, even though this direct link between CCP and PLA is vanishing over recent years. The main factors for this increasing distance between CPP and PLA are professionalism, bifurcation of civil and military elites, a reduced PLA role in political institutions, reduced emphasis on political work within the PLA, and increased military budgets. (Civil-Military Relations in China: Assessing the PLA’s Role in Elite Politics Institute for National Strategic Studies China Strategic Perspectives, No. 2 Series Editor: Phillip C. Saunders National Defence University Press Washington, D.C. August 2010).

There is a strong focus to modernise PLA defence forces especially concerning the set-up of joint operation systems and the acceleration of the development of new and high-tech weaponry and equipment. Therefore, the reform and development of science and technology for Chinese defence is a main focus of the Chinese defence strategy. Focus areas are for example aeronautics, space and electronic information.

One section of China’s white paper on Defence Policy focuses on “Participation in International Exchanges and Cooperation” and expresses the willingness to cooperate in defence technologies with friendly nations (e.g. bilateral cooperation with France, the United States and ESA in the fields of space technology, space exploration and space science).

To support the national development of science and technology China runs several national R&D programmes. For example “Programme 863” it focuses on high-tech areas, its total fund is over €1

(23) http://ec.europa.eu/trade/policy/countries-and-regions/countries/china/
billion over a five years period and it is promoted to EU under the name "ChinaAccess4EU"\(^{(26)}\). The main objectives of all national programmes are to strengthen independent innovation in China

Moreover there is a tremendous and still enlarging quantity of engineers and scientists in China\(^{(27)}\). Prejudice that China merely produces rote learning is proving wrong. China is catching up on High-quality innovation as can be read in "The Global Innovation Index 2016" published by WIPO\(^{(28)}\).

Looking at the actions taken by the European Industry to reduce costs, one popular action is still the relocation of production to countries with available, well educated, cost-efficient employees. According to a study of PA Consulting Group Deutschland China has a 27% share in the market of production\(^{(29)}\). Achieved cost reductions range between five and 45% with an average of 20%. Relocation of production has four main critical success factors: transfer of knowledge, a clearly defined relocation strategy, close cooperation and professional project management. Relocation focuses usually on the low tier industry and low added value. About half of the companies have to deal with losses in quality and shortfalls in production. Nevertheless the chance to realise cost reductions up to 45% is worth to be considered.

Recently, China launched the New Silk Road Economic Belt initiative (also called One Belt, One Road OBOR) aiming at drastically re-balancing its maritime and terrestrial relationships to the West. In response to a complex geopolitical setting in the east, which China associated with "uncertainty", and recognising that its relations with the USA and Japan could not realistically be improved beyond a certain level due to structural competition, and that a great power needs the support of its neighbouring countries in order to rise further, China opted for a strategic westward orientation, or "March West".

**OBOR’s geostrategic significance for the EU**

Improving infrastructure along the land-based Silk Road Economic Belt has the potential to contribute to economic development and regional stability in Eurasia from which both China and the EU could benefit in terms of new markets and energy security. OBOR thus opens opportunities for the EU to pursue its geostrategic ambitions in Central Asia by deepening the EU-China strategic partnership through cooperation in non-traditional security fields, possibly paving the way to EU-Russia reconciliation. The maritime trajectory of OBOR will sooner or later require the EU to take a more outspoken position on maritime disputes in the South China Sea in favour of an international rules-based order.

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\(^{(28)}\) (Cornell University, INSEAD, and WIPO)

\(^{(29)}\) [https://rsw.beck.de/cms/?toc=BC.960&docid=137679](https://rsw.beck.de/cms/?toc=BC.960&docid=137679)
If OBOR is considered to be ‘the most ambitious infrastructure-based security initiative in the world today’, it may be argued that it could be advantageous for the EU to consider how its existing policy tools and strategies, such as the European Neighbourhood Policy (ENP) and the EU Maritime Security Strategy, could be linked with OBOR and how this strategic alignment could feed into the EU’s new Global Strategy for Foreign and Security Policy which came out on 29 June 2016.  (Ref Briefing to European Parliament – July 2016 – European Parliamentary Research Services – EPRS – Author Gisela Grieger – PE 586-608).

However, as its Gentle Neighbour Policy is not yet well accepted by Asian public opinions, China’s New Silk Road initiative is raising some concerns in some European circles, being seen as an economic tool to foster West Asia and Eastern Europe dependency to China with an ultimate defence & security agenda under the business.


**Figure 6: SWOT China**

<table>
<thead>
<tr>
<th>STRENGTHS</th>
<th>WEAKNESS</th>
</tr>
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<tbody>
<tr>
<td>Costs benefits in the production</td>
<td>Tries to move/influence balance of power</td>
</tr>
<tr>
<td>Strong investments in R&amp;D</td>
<td>Bilateral transfer of competences</td>
</tr>
<tr>
<td>Strong interest to close technology gaps</td>
<td>Increases long-term threat</td>
</tr>
<tr>
<td>Available high skilled resources</td>
<td>Increasing decay of European industrial and economical strength</td>
</tr>
<tr>
<td>Cooperation stabilizes relations</td>
<td>Powerful and friendly neighbor policy not well understood in Europe</td>
</tr>
<tr>
<td>Transfer of European values</td>
<td></td>
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<tr>
<td>Bet on economic inter-dependencies</td>
<td></td>
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</tbody>
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<table>
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<tr>
<th>OPPORTUNITIES</th>
<th>THREATS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Close technology gaps faster</td>
<td>Weak protection of intellectual propriety rights</td>
</tr>
<tr>
<td>Less dependence from US imports</td>
<td>Dependence from imports</td>
</tr>
<tr>
<td>Reduce production costs</td>
<td>Expansion strategy (Chinese See)</td>
</tr>
<tr>
<td>Increasing market for export</td>
<td>Likely USA, Japan, South Korea will be reluctant to high profile cooperation with China</td>
</tr>
</tbody>
</table>
Analysis

Potential long-term strengths of cooperation with China found by our analysis are:

✓ Relocation of production can lead to significant cost benefits for the European defence industry and subsequently help to fill capability-gaps more efficiently for the EU nations.
✓ China’s strong investments on R&D facilitates growth for high-tech companies in the EU.
✓ China and the EU have a strong common interest to close technology gaps.
✓ China’s enlarging quantity of scientist and engineers can help the EU nations to counter the expected demographic aftermath of decreasing birth-rates.
✓ Close cooperation can stabilise relations and lead to friendship, prosperity and long term peace, comparable to the relation France and Germany have shown over the past seven decades.
✓ Cooperation also facilitates a mutual understanding of culture and behaviour and may be an enabler to transfer European values such as freedom of press to China.

Weaknesses of cooperation with China:

✓ Rising tensions appear between China and neighbours with disputes on EEZ, reefs, islands and straights control.
✓ European Public Opinion and Media have little understanding of Gentle Neighbourhood policy, staying focused on the "expansion agenda" and ignoring for example anti-piracy actions of Chine Navy in Asia, Africa and the Middle East.
✓ Bilateral transfer of competencies can increase future high tech threats if conflicts rise between the cooperation partners.
✓ A missing competitive capability of the EU Nations may accelerate the decay of industrial and economic strength.

Opportunities

✓ More money and more resources for R&D can boost the speed of innovation and help to close technology gaps faster.
✓ This may dissolve or at least weaken current monopolies and can reduce dependence of the EU Nations from the US export policy
✓ China provides, simply due to its economical size, a great chance for export of high tech defence and security equipment.
✓ A possible move from small batch series to code-development / mass production should lead to lower development / productions costs per system.

Threats:

✓ Intellectual Property Rights protection is limited by law and shows little effects in practice
✓ Greater cooperation would lead to more dependence from imports
✓ China’s openly expansive posture would lead to serious conflicts with established allies of the EU.
✓ Very likely USA, Japan, S. Korea will be reluctant to high profile military cooperation with China. Will rather accept slow/low profile confidence building steps.
Conclusions

European Military and Industry agenda will for long remain focused on keeping one or two steps of leading edge with regard to Military capabilities and technologies, while EU industry will also look at China as a possibly fast growing Export market and cost efficient development and production area. Chinese government and Industry will likely actively engage in Military cooperation efforts (focused first on joint peace keeping, tighter stabilization initiatives) and co-development co-production arrangements so to match their fast learning agenda.

In order to go over the present restrictions in EU Military Export and Armament cooperation (focus on non-lethal or non-expeditionary technologies), two important factors are to be met. First, the Chinese "Gentle Neighbourhood" policy has to pay its dividends in gaining USA, EU and immediate neighbour’s acceptance and support by letting China play a regional stabilization role and finding a modus vivendi on on-going tensions on disputed EEZ, reefs, islands and straits.

Second, finding a new balance of power and responsibilities in Region with the USA will be key given their interests and alliance networks. New Silk Road Initiative (also named One Belt, One Road OBOR) is a powerful tool to re-invigorate trade and interdependencies between China and Europe and create a rationale for increased military and armament & security cooperation between China and Europe. In this respect, both EU and European Mil industry have a card to play by offering alternative or complementary cooperation avenues to China.

Extra European cooperation with China provides a chance to produce significant benefits from a political, military and industrial perspective. As already mentioned, this kind of Extra Cooperation needs more time to develop and will produce its benefits only under a long-term perspective. Nevertheless, the EU is already trying to enhance cooperation with China as shown through the "negotiations of a comprehensive EU-China Investment Agreement". If this Agreement is successful, some of the threats and weaknesses will diminish. Furthermore, China and the EU have to gain a better mutual understanding of each other’s security interests, including the security interests of allies. Mastering these main hurdles, Extra-European Cooperation with China can provide valuable benefits to the EU and its Nations.

India – the Spicy Companion to the Drink

There exists a significant untapped potential for closer defence cooperation between European countries and India. India is one of the world’s biggest economies, with a rapid average growth rate (8% GDP in the last decade), and is on a verge of becoming a global power. In addition, European countries and India are committed to the principles of democracy, human rights and freedom, which provide a strong foundation to further explore possible areas for cooperation.

The following pictures illustrate the most relevant Strengths, Weaknesses, Opportunities and Threats in this respect, from a European point of view.
In the emerging multi-polar world order India should be considered to be a candidate for becoming a global power. Thanks to close links and a history of positive records in politics, economy, defence, education, and science there are solid and favourable foundations on which strengthened ties can be built. With India’s economic fundamentals and good development perspectives, India is a prospective economic partner and investment destination, also in defence industry.

The strategic partnership signed with the EU in 2004 gives India the possibility to expand their security dialogue and their links with the defence industries in Europe by creating new ways for cooperation on strategic and global issues. As a nuclear power, India can be considered as a responsible stakeholder for the stability in South East Asia. Furthermore, India and the EU are committed to enhance counter-terrorism cooperation, as formulated in the 2005 Joint Action Plan, the 2009 Summit Declaration, and particularly the Joint Declaration on International Terrorism of 10 December 2010. To this end, India also supports EU efforts to stabilise the situation in Afghanistan and cooperates in the areas of natural disasters and sea lane controls in the Indian Ocean to reduce piracy attacks and drugs and arms smuggling.
Despite numerous political declarations and consistently growing trade relationships, however, the predominant view is that no substantial upgrading of India-EU relations has yet taken place, especially in the security and defence domain. Initiatives to use the above mentioned strengths to realise opportunities (in both views, see pictures) are currently rather limited to special cases (e.g. EU participation in India’s Smart Cities initiative; EU support to Foreign Direct Investment (FDI) in India (40% of the total budget)) and are not seen in the context of a more global strategic partnership for the benefit of both, European countries and India.

According to references available India’s defence budget amounted to circa $40bn in 2015-2016, showing 8% increase compared to 2014. This increase is expected to continue in the 5 years perspective. Budgets allocated to Procurement and R&D dropped, however, to 25% (from 34% in the previous decade). These figures clearly show a huge potential for European-Indian cooperation in order to strengthen the European Defence and Technological Industrial Base (EDTIB) while supporting Indian’s ambitious programme on modernisation of the armed forces at the same time. This might also lead to more include India in the global supply chains of European industries and transfers of technologies. However, it is crucial that the above mentioned threats are always taken into account, especially in the light of India’s ambition to limit imports (mainly from US, Russia, Israel and France) of defence products in order to promote their technology and production facilities.

Nevertheless, some European-Indian projects have already been launched. The European Aeronautic Defence and Space Company (EADS) perceive India as a potential partner in developing modern technologies. EADS is also a bidder in the Medium Multi Role Combat Aircraft (MMRCA) of the Indian Air Forces with the Eurofighter Typhoon, recognising India’s potential role in further developing and customising this aircraft.

It must also be recognised that Germany has already set up a special working group with India, which is very much focused on the exchange of information related to R&D and armament procurement programmes. This partnership seems to be unique in Europe because it particularly includes activities like common mountaineering expeditions of instructors from both armies, gaining experiences in deployment to high-altitude areas, topography, training of military leaders, medical services, logistics, etc.

Looking at the SWOT analysis, it is evident that India’s strengths and opportunities lie in exchanging experiences between security and defence industry experts on a technical level, mainly due to the high reputation of technical universities in India. The setting up of small technical joint working groups in various leading European and Indian companies would be a possibility to use the potential of engineers or researchers and to overcome cultural differences step by step.

Conclusions

Building on already existing partnership arrangements between the EU and India it is worthwhile for European countries to further investigate and deepen possible areas for a more strategic cooperation. On the basis of the aspects mentioned in the SWOT analysis, a step by
step approach on technical and operational level is recommended in order to use strengths and reduce weaknesses. In this respect, the German/Indian working group could be seen as a role model, on a wider European level, to facilitate a dialogue between partners of different organisations in Europe and India. However, to establish a more strategic approach, it is crucial to institutionalise such dialogue by associating European defence associations with their Indian counterparts.

It is evident that a more strategic cooperation between European countries and India may provide significant business opportunities for all partners involved, especially in the field of electronics and cyber - giving a tremendous potential of Indian highly skilled personnel.

**Overall Conclusions**

After having studied several additional ingredients to the current European cocktail of cooperation, a picture emerges of possible revitalization of the Defence Industry cooperation. Mainly positive effects, but also new dependencies with new actors that needs to be scrutinized from a security policy perspective. As discussed, extra-European cooperation can have a positive effect on safety and stability (building alliances). Secondly joint programs can result in better alignment in capabilities and better focus in R&D efforts.

Following Brexit and the new transatlantic policies of the US, the European Union looks committed to improve dramatically its cooperation in Defence. This process of integration in Defence will affect the bilateral relations that all the Member States maintain with third parties. Is Europe capable to substitute or complement its Member States in defence cooperation initiatives that are currently on-going or envisaged? A general answer is that these initiatives are difficult to afford. Nevertheless, as a general tendency, we can envisage a process in which EU will, step by step, take a more relevant role on these issues.

Starting from NATO, which is a basic alliance for security and peace in Europe, the new role of the European Union in Defence will have mainly positive effects, contributing to balance the collective effort between both sides of the Atlantic. The investment of the European Union in defence R&D and capabilities need to be oriented to complement the contributions of its Member States to the collective defence in the framework of NATO. EU could also play a relevant role to solve diplomatic conflicts inside the Alliance, like the case of Cyprus. Nevertheless, the EU needs to find its official role in NATO and being a more relevant player, tensions with the US cannot be excluded. After Brexit the United Kingdom could play a go-between role between the US and EU.

A stronger role of European Union in defence issues could also play a very relevant role to make more equilibrated current relations with the US. The difference in size and defence investment and capabilities between US and every European Member State has created an unbalanced relation that, contrary to the current position of the American Administrations, has been more positive for the US than for Europe, from an economical and industrial point of view. If it is
true that the US has largely invested in the security of Europe, the US has gained access to strategic logistic and deployment bases in Europe that the US defence industry is providing to NATO and European Countries key capabilities. The temptation for US to play with bilateral relations with key partners in Europe to counterbalance the power of the European Union as interlocutor in the defence field could become a reality. The way that these relations will be established and the benefit for all the parties would be the source of a win-win solution for the cooperation between Europe and US.

As announced in the Global Strategy of the Union, Europe needs to play a stronger role in the global world, including Asia. Peace and stability in Asia is a prerequisite for European prosperity and security. Europe is working with China and India towards ambitious free trade agreements. Extrapolation of these agreements to military technology is more difficult, especially with China. Nevertheless, cooperation in some technological fields could be a way to build confidence between parties.

The European Union is becoming a maritime security provider. Playing this role in Indian and Pacific Oceans will need the cooperation of local powers like China and emerging powers like India. This could be one of the drivers to reinforce cooperation in defence with these countries. Following the European commitment with International Law and human rights, EU will support democratic transitions in this area. Conflicting interest with China could be expected sometimes. The way in which these tensions will be solved will strongly influence the cooperation schemes with China.

China has increased its defence budget by 150% over the past decade and it is investing an enormous budget in R&D for defence. The global presence of China, with strong economic interests around the world, together with the reinforcement of its military power, with an increased capability to project this power out of its traditional areas of interest in the Pacific Ocean, will be a source of possible tensions with Europe in the future. Diplomatic efforts and the establishment of a military cooperation could be a way to drive the relations between EU and China in the future.

Considering technological cooperation with China, if the current investment effort remains at similar levels, the technological breath between Europe and China could close in the very near future or even invert the tendency towards a weaker Europe compared with China. Close monitoring of this evolution is needed in order to drive possible industrial cooperation.\(^{(30)}\)

From the political point of view, India is an easier partner, capable to share most of the principles of Europe with respect to democracy and human rights. At military level, while investing a lot in defence, India remain focused in assuring its own security without projecting this military power in a global way. All these factors make an easier cooperation from a political and military point of view.

At industrial level, India is an interesting market for European defence industry. Nevertheless, India is searching for a more mature defence acquisition process, reinforcing national participation, based in a larger technological capability. Cooperation between European and Indian companies for the development of new technologies and capabilities is the necessary way to access this market and it could also contribute to enlarge some European capabilities, taking into account the high technological level that it is being reached by India.

As Europe wants to become and remain a global power, not only at economical level but also at strategic and military level, there is a need to reinforce cooperation and coordination among European Member States, while also creating strong alliances with third parties in order to align the efforts for stabilization and security around the world. NATO will remain as the pillar of European security and the US will also remain as the main ally and granter of European freedom. A stronger role of Europe in international diplomacy and security will imply new defence global endeavours which should need to reinforce regional alliances currently active among main EU Member States and countries like India or Japan. New alliances with big powers like China, which are reinforcing their military power look necessary but will be more difficult to reach due to the lack of confidence and the number of possible tensions that could rise in the future.

The need for military cooperation beyond, as well between European countries, is evident. Combined with the need for alignment of resources, budgets, capabilities and an agreed R&D agenda this must be the challenge for the coming years. If Europe can get a better grip on internal alignment on these matters “extra European” military cooperation becomes more within reach.
Committee 6

Which European regulatory framework is needed for a competitive European defence industry?

Pilots: Ron NULKES, Alexandre PENLEY, Roland TEHEUX

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Executive summary

During the 2017 SERA (European Session for Armament Officials) committee 6 was tasked to look into Directive 2009/81/EC (Directive 81) and to provide the answer to the question “Which European regulatory framework is needed for a competitive European Defence Industry?” The assignment given to committee 6 is seen as twofold, one part is to examine how the existing regulatory framework is working in practice and the second is to put forward recommendations how to develop the existing regulatory frameworks or other means to stimulate cooperation in order to support a competitive European Defence Industry.

Directive 81 governs the procurement for defence and non-military security supply, services and work contracts aiming to harmonize acquisition procedures throughout the EU, firstly, by restricting offsets, increasing competition and encouraging cross-border bidding among European bidders. This is designed to prevent systematic sole-source procurement or non-competitive procurement solely from national suppliers. And secondly, by increasing transparency through the obligation to advertise subject tenders in the Tenders Electronic Daily system (TED). Both should lead to strengthening the European Defence and Technological Industrial Base. All nations have transposed the Directive 81 by 2013, Nevertheless, we observe that member nations still make use of the wide range of exemptions to defend national interests. These exemptions are government-to-government sales, international agreements, international organisations and finally the essential security interests (Treaty on the Functioning of the European Union (TFEU), Art 346). As there is no strict follow-up and enforcement by the European Commission the Member States (MS) will only put smaller defence equipment purchases out for European tendering whereas the medium and large programs still follow the exemptions route.

Directive 2009/43/EC (Directive 43) on Intra-Community Transfers of Defence Products is closely linked to Directive 81 and both establish an industrial policy and legislative framework to improve competitiveness, introduce greater transparency, and cut unnecessary red tape in the defence sector. Directive 43 seeks to improve the functioning of the EU defence equipment market, promote integration of the EU defence supply chain and increase security of supply, by simplifying the rules and procedures for intra-EU transfers of defence-related products. However, the implementation of the directive differs between nations and even between regions across Europe.

Initially committee 6 investigated the subject more closely by interviewing national stakeholders to check how the directive was implemented in the different nations across Europe. A SWOT analysis revealed the strengths, weaknesses, opportunities and threats for the Directive 81. The assessment led to a set of six recommendations to increase cooperation between nations and European defence industry as well as promoting open and cross-border competition. These recommendations are:

1. Harmonise regulatory frameworks to foster closer (NATO & EU) cooperation at an early stage in the procurement process.
2. Support implementation of “Preparatory Action on Defence Research” (PADR) and increase investments in innovation.
3. Improve the knowledge of Directive 81 towards government officials and industry (including Small and Medium Enterprises).

4. Create a central and common EU Market Place by improving information exchange.

5. Better follow-up and enforcement of Directive 81 by the EU on how it is implemented by nations and sanction if necessary.

6. Directive 43 should be implemented in all EU countries with greater harmonization.

**Assignment**

**Tasking**

The question committee 6 needed to answer was: "Which European regulatory framework is needed for a competitive European Defence Industry?".

**Overview**

Based on the national implementation of Directive 2009/81/EC of the European Parliament and of the Council of 13\textsuperscript{th} July 2009 in the Member States (MS), experience to date and the conclusions from the European Commission report on the review of its implementation dated November 2016, this report will seek to work out what further actions need to be taken to support the development of a competitive European defence industry.

**Interpretation and Aim**

The assignment given to committee 6 is seen as twofold, one part is to examine how the existing regulatory framework is working in practice and the second is to put forward recommendations for how to develop the existing regulatory frameworks or other means to stimulate cooperation in order to support a competitive European defence industry. It should be possible to implement those conclusions and recommendations in an open market with free competition, with the ultimate goal to involve and increase competitive local industry’s place in the value chain, whatever their size and position in the supply chain. Conclusions and recommendations are based on an analysis of identified areas for improvement describing strengths, weaknesses, opportunities and threats. They should apply to both industry and government and take into account the interests of larger companies as well as small and medium sized enterprises (SME).

**Exclusions**

The European Defence Action Plan (EDAP) will not be dealt with in great detail as the model for handling its initiatives and the role of the European Defence Agency (EDA) in that process is still under development, although relevant issues will be incorporated in this report.
Introduction

Recent political context of EU and initiatives regarding security and defence to date and background of EU regulatory framework for the defence sector

European security policy has followed several different paths since World War II (WWII), developing simultaneously within the Western European Union and NATO and evolving into the context of the European Union (with 28 members). The following paragraphs give some recent chronological insights into the regulatory framework and the entities governed by it, which creates the present European landscape of security and defence. For more historical background on entities, treaties, frameworks and the like see Annex A.

We start with the Council Common Position 2008/944/CFSP(1) that was adopted 8 December 2008 defining common rules governing control of exports of military technology and equipment. It lays down a notification and consultation mechanism for export license denials, including a transparency procedure (publication of EU annual reports on arms exports). It also contains eight risk assessment criteria that all EU countries apply to their licensing decisions for exports of conventional weapons. Later the Common Position was complemented with a User Guide to improve harmonized usage throughout the MS. Subsequently a unified EU military control list was adopted(2). The EU Common Position has contributed significantly to the convergence of national arms export control policies.

On May 5 2009 the Council Regulation (EC) No 428/2009(3) setting up a Community regime for the control of exports, transfer, brokering and transit of dual-use items was adopted. The aim of the Regulation is to prevent the risks that these items may pose to international security. The controls derived from international obligations (in particular UN Security Council Resolution 1540, the Chemical Weapons Convention and the Biological Weapons Convention) are in line with commitments agreed upon in multilateral export control regimes. The EC subsequently conducted a review which produced a report to the Parliament and Council in late 2013 leading to an EC Communication in 2014 and later on to an Impact Assessment report. In September 2016 the EC adopted a proposal for modernization of the Regulation(4).

A major step was the Treaty of Lisbon being signed in October 2007 and coming into force in December 2009(5). The Treaty of Lisbon further re-emphasizes that the EDA supports the MS

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(4) Regulation of the European Parliament and of The Council setting up a Union regime for the control of exports, transfer, brokering, technical assistance and transit of dual-use items http://eur-lex.europa.eu/resource.html?uri=cellar:1b8f930e-8648-11e6-b076-01aa75ed71a1.0013.02/DOC_1&format=PDF
and the Council in their efforts to improve European defence capabilities in the field of CSDP (Common Security and Defence Policy) as it exists now and develops in the future.

The signing of the Treaty renamed the European Security Strategy the CSDP, which is a major element of the Common Foreign and Security Policy of the European Union (EU) and is the domain of EU policy covering defence and military aspects, as well as civilian crisis management. Formally, the CSDP is the domain of the European Council under the auspice of the heads of Member States. Nonetheless, the High Representative of the Union for Foreign Affairs and Security Policy, currently Federica Mogherini, also plays a significant role. As Chairperson of the external relations configuration of the Council, the High Representative prepares and examines decisions to be made before they are brought to the Council.

Before the signing of the Treaty of Lisbon the EU Commission had very marginal competence and decisive powers regarding defence matters. This competence was firmly anchored within the respective MS and there had only been some small advances made by the EC to shape the market and the industrial landscape. This was in the form of the initiation of studies regarding, for example, defence procurement and export control of transfers of defence goods within the EU. Since the signing of the Treaty of Lisbon the EC has, based on the above, made several advances within the defence area, especially the issuing in 2009 of Directive 2009/81/EC on defence and security procurement, which aims to coordinate procedures for contract awards\(^6\), and Directive 2009/43/EC on intra-EU transfers of defence related products, which aimed to simplify the terms and conditions for transfers of defence-related products within the EU\(^7\), jointly referred to as the “Defence Package”. This was the first step towards the establishment of an industrial policy and legislative framework to improve competitiveness, introduce greater transparency, and cut unnecessary red tape in the defence sector.

An EU regulation is binding in its entirety and applicable with immediate effect at MS level when adopted by the EU legislator; it therefore does not need to be transposed into national law. A directive is also binding upon MS with regards to its purpose and content, and enters into full effect at MS level when it has been published in the Official Journal of the European Union (i.e. the day after publication).

Directive 81 governs the procurement procedures for defence and non-military security supply, services and works contracts. The Directive aims to harmonize acquisition procedures throughout the EU. Firstly, by increasing competition and encouraging cross-border bidding among European bidders. This is designed to prevent systematic sole-source procurement or non-competitive procurement from national suppliers. And secondly, by increasing transparency through the obligation to advertise defence contracts in the Tenders Electronic Daily system


Various contract performance conditions make indirect offsets in defence contracts incompatible with EU Community law.

Furthermore Directive 81 also states that it shall not apply to contracts awarded by a government to another government relating to: the supply of military or sensitive equipment and its directly linked works and services; or works and services specifically for military purposes, or sensitive works and sensitive services.

Directive 2009/43/EC (Directive 43) on Intra-Community Transfers of Defence Products seeks to improve the functioning of the EU defence equipment market, promote integration of the EU defence supply chain and increase security of supply, by simplifying the rules and procedures for intra-EU transfers of defence-related products. The Directive establishes three types of intra-EU transfer licence, and several general export licenses as well as a voluntary certification regime for companies. The EC conducted a review of the functioning of the Directive in 2016 and concluded that it helped open up the internal market for defence but that much more progress was needed.

The current EU political leadership has invested heavily in driving EU cooperation within defence. Defence cooperation has become the central narrative for what the EU will entail in light of e.g. Brexit and other major global events. The European defence industry is now seen as an enabler and door opener for achieving broader EU objectives (Jobs, Growth, Innovation and Competitiveness).

For an overview of recent important developments, see figure 1.

![Figure 1 – Recent developments within the EU.](image)

The European Defence Action Plan (EDAP) was launched in November 2016. It describes the fact that the EU defence market suffers from fragmentation and insufficient industrial collaboration. That is why the EDAP underlines the need for MS to invest in strategic (land, air, space and maritime) capabilities in order to stay ahead of the challenges the EU is facing. The actions proposed will lead to a stronger EU in defence, and ultimately a stronger NATO.

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As a first, the EDAP launched the idea of an EU Defence Fund in two parts: a "Capability window" and a "Research window" (see figure 2). It also aims at enhancing, amongst other things, joint cooperation between MS, such as investment in defence supply chains, development of regional clusters, helping to finance Small and Medium-sized Enterprises (SMEs). Furthermore, it wants to strengthen the single EU market for defence, and thereby maximize military synergy across EU politics.

The capability window will be financed through the pooling of national contributions and, where possible, supported by the EU budget. As advised in February 2016 by the Group of Personalities on European Defence research (GoP)(10), the research window will be supported by an EU Commission’s (EC) Preparatory Action(11) (PA) on CSDP-related research in the timeframe 2017-19. This could call for an estimated annual investment of 500 million Euro by 2020. If successful, the Commission’s PA might become a game-changer in the field of European defence research. It could pave the way for permanent funding from the European Commission to support CSDP-related research.

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The "Window" is to foster supporting investments in joint research and joint development of defence equipment and technologies. The "Research Window's" first step is a "Preparatory Action on Defence Research" (PADR) with "EC contributing" a proportion or sum of the funding towards a "unique" demonstrator project. This first step will cover the period 2017-2019 and a sum of 90 million Euro. The "Capability Window" is still under design with important aspects like financing mechanisms, role of the European Commission vis-à-vis MS, forms of cooperation (PESCO, EDA, CDP, CARD etc.) still under discussion. An European Defence Industry Development Programme (EDIDP) has been launched to implement the "Capability window". Likely to include 5 to 6 "pilot projects" to test feasibility of EDIDP. This is a MS-driven process (i.e. decision on programmes, financing, IPR, eligibility criteria etc.). The EC is to contribute administrative support and possible fiscal or financial incentives are to be proposed. The "Windows" are largely complementary and interdependent to each other’s success.

On 7 June 2017 the European Defence Fund (EDF) was formally announced and introduced\(^\text{(12)}\). As stated before in the text as well as in the press release, it consists of a research and a capability window. The research part consists of the PADR, and from 2020 onwards a confirmed amount of 500 million Euro per year (EU budget). The capability part splits into two sections. First, a development part in which MS will co-finance with the EU to jointly develop defence capabilities, which will be 500 million Euro in 2019-2020. From 2020 500 million euro per year should be made available. Second, an acquisition part in which MS acquire defence capabilities, for which approximately 500 million euro per year will be allocated. This will be created through a so-called ‘Financial Toolbox’, a ready to use, standardized financial instrument within the framework of the current agreements.

In the press release it is stated that the greatest support in the context of capability development will be given to cooperation as in a PESCO (Permanent Structured Cooperation) construct. In that case the EDF will allow for higher co-financing rates. Furthermore, the instruments of the ‘Financial Toolbox’ could be implemented with the help of European Investment Bank (EIB) or other relevant partners. Recently the EIB has announced its willingness to scale up these investments and assess if policy gaps need to be repaired. In the beginning of 2018 the EC will discuss in the European Parliament and the Council the adoption of this Regulation and if the financial construct then will be supported. It is envisioned that the Development Programme will be operational early 2019.

\(^{\text{(12)}}\) \url{http://europa.eu/rapid/press-release_MEMO-17-1476_en.htm}
State of Play of Regulatory Framework

Scope: This chapter provides an overview of regulatory framework in the context of:
✓ the status of the European defence market,
✓ the primary intentions of Directive 81,
✓ how the transposition of Directive 81 has been implemented throughout the EU, and
✓ what the impact on national defence procurement practices has been in selected EU states up to 2nd quarter 2017.

Status of the European Defence Market

For many years the EU defence market was considered to be outside the scope of application of EU regulations. It has been fragmented by the internal markets of each MS, with a complete lack of competition, with a strong preference for either national or US procurement leading to inefficiencies, duplication and small numbers (e.g. the fighter aircraft market, either bought from the US or several EU developments - Rafale, Gripen, Eurofighter), far below making use of economies of scale seen from a European Union point of view. Strong strategic bonds between a national procurement organisation and national suppliers have secured supplies, but lead to high cost of ownership and less competitiveness in the global market. Some examples of small numbers are frigates and legacy UAV systems.

According to the EDAP EU Factsheet(13) around 80% of defence procurement is run on a purely national basis, leading to a costly duplication of military capabilities. A competitive EU wide procurement process was the exception.

Before Directive 81, Article 346(1)(b) of the TFEU allowed to exclude the entire defence sector from EU legislation. Prior to the introduction of TFEU, contracts related to defence and security fell within the scope of Directives 2004/18/EC or 2004/17/EC (the civil procurement directives), if and when considered to be applicable by the individual EU MS.

The main reasons to apply exemptions to a European competitive approach for public contracts related to defence and security prior to Directive 81 were:

✓ Art 346, (1) (b) of the TFEU: (b) any MS may take such measures as it considers necessary for the protection of the essential interests of its security which are connected with the production of or trade in arms, munitions and war material; such measures shall not adversely affect the conditions of competition in the internal market regarding products which are not intended for specifically military purposes.
✓ Article 14 of Directive 2004/18/EC and Article 21 of Directive 2004/17/EC, which offer exclusions of contracts: “when they are declared to be secret, when their performance

must be accompanied by special security measures in accordance with the laws, regulations or administrative provisions in force in the Member State concerned, or when the protection of the essential interests of that Member State so requires”.

Directive 81 is clear in its definition on Art 346 (1)(b). It cannot be considered as a general exemption of defence and security related contracts from EU legislation, but must be carefully justified on a case by case basis. In contrary, its intention has not been fully adopted by the MS. If a MS chooses to apply the Art 346 exemption incorrectly then the MS should be challenged to present the justification to the EU.

**Primary Intentions of Directive 81**

The general objective followed by the EU is to establish an open and competitive European Defence and Equipment Market (EDEM). For that purpose the regulatory framework for the MS for defence procurement was established through Directive 81 with a default procurement strategy of open competition within the European market (see figure 3).

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(14) C SWD(2016) 407 final COMMISSION STAFF WORKING DOCUMENT Evaluation of Directive 2009/81/EC on public procurement in the fields of defence and security, chapter 2.1.2, p. 17; Fig 3.)
Transposition of Directive 81

Article 72 of the Directive 81 allowed the MS to "adopt and publish the laws, regulations and administrative provisions necessary to comply with the Directive" by 21 August 2011. This required implementing all measures for Directive 81 to become national law and to be applied by that date. Directive 81 was fully adopted by May 2013. There were some delays in transposing the Directive into national law. For example some countries wanted to protect national champions providing defence equipment. Other countries had a complex legal structure which took time to work through.

Impact on National Defence Procurement

The Commission’s report to the EU Council on the implementation of Directive 81 is based on the review criteria in Article 73(2) of that Directive. The report addresses both the transposition process itself and the functioning of Directive 81. The supporting working paper contains an analysis of the Directive against five criteria: effectiveness, efficiency, relevance, coherence and EU added value(15). Its conclusions can be summarised as follows:

1. Effectiveness: the Directive has partially achieved its objectives, leading to an initial increase of competition, transparency, and non-discrimination, and decreased the use of exemptions. Nevertheless, the commitment of MS towards applying the Directive remains uneven. A very significant share of defence procurement expenditure still remains outside EU public procurement rules.

2. Efficiency: The EU Commission considers the additional administrative burden is negligible and the evaluation has demonstrated that overall the Directive is efficient. Further work aimed at ensuring a greater and more consistent use of the Directive by MS would also result in increasing the savings and, therefore, further enhancing its efficiency.

3. Relevance: The aim and objectives followed during the creation of the Directive remain fully valid, i.e. the Directive remains relevant.

4. Coherence: Since transposition of the Directive no inconsistencies or other coherence problems between the different provisions of the Directive and the other elements of EU public procurement legislation, or with other EU instruments and policies (e.g. Directive 43) have been identified.

5. Added Value: In the belief that the text of the Directive is going to achieve its objective, the EU Commission considers it will deliver added value.

In conclusion, there is a consensus among MS and stakeholders that "the text of the Directive is broadly fit for purpose and that amending the Directive is not necessary."

Before transposition, in the period 2008-2010, 1,844 defence contract notices were published

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EU-wide. The total value of these contracts was estimated to be nearly €8.8 billion, which was equivalent to 3.3% of the EU’s total defence procurement expenditure in the same period (€263.23 billion, 2008-2010). Correspondingly, 0.86% equivalent to €2.26 billion were cross-border contracts.\(^{(16)}\)

During the short period since full transposition of the Directive a steadily increasing amount of defence and security products have been procured by application of the EU framework set out in the Directive. The exemptions allow MS to deviate from competition for cooperative programmes building on common investments in research and technology (EC2009/81, Art 13 c), co-operative programmes governed by international agreements and procedures (EC2009/81, Art 11), and those for which the release of information would be considered an essential breach of security interests EC2009/81, Art 13 c). A significant amount of new investments in defence and security will continue to fall into these exemptions to the application of competition.

As the transposition of Directive 81 and an evaluation of the effectiveness of its implementation is not available in a quantitative format from all EU member states, the auditors of Committee 6 conducted an ad hoc survey of the situation in their respective nations, in particular to identify the degree to which open competition is applied in defence and security programmes.

The information available differs considerably. While some nations have published full statistical data of all contract awards and the application of Directive 81, other nations have not yet implemented a full statistical analysis. In summary the survey revealed the following:

1. Offset: Prior to the transposition of Directive 81 all states had applied offsets in one form or another in defence programmes. Legacy cooperative programmes still exist, which are subject to explicit offset agreements in all states, some states have rules in place regulating the application of offsets.\(^{(17)}\) Although the Commission stated that offsets violate the fundamental principle of non-discrimination in primary EU law (i.e. the TFEU) and therefore offset requirements are contrary to the proper functioning of the internal market, offset is applied in some states, while it is abolished in others. Under Directive 81 offsets are strictly forbidden but in some states a limited number of exemptions still exist, which allow them to apply offsets once the exemption of TFEU Art. 346 has been exercised and its applicability has been demonstrated to the EC. The figure 4 below illustrates the different cases. The assessment of the impact of these offsets varies between offering an opportunity to develop technology in the state receiving offsets while it is also considered to increase procurement prices. Whether or not the technology developed with assistance of offset funding is competitive and sustainable in the EU or global market remains a question to be answered.

2. Transposition of Directive 81 into national law had been completed in different manners...

\(^{(16)}\) C SWD(2016) 407 final COMMISSION STAFF WORKING DOCUMENT Evaluation of Directive 2009/81/EC on public procurement in the fields of defence and security, chapter 2.2.2 -2.2.3

in all states by 2013, in some cases with quite a delay after the date it was intended to be transposed (August 2011). If the Directive is transposed into national laws which contradict or change its purpose and effectiveness, it will still be applicable. In other words, it is directly applicable in addition to the national legislation and will substitute the national provisions if they run contrary to the purpose of the directive.

3. Exemptions from the application of EU law according to TFEU Art 346, i.e. when a state is obliged to supply information, the disclosure of which it considers contrary to the essential interests of its security, is included in national law, and this possibility is used, nevertheless this is not general practice anymore and the earlier carte blanche for TFEU Art 346 exemptions is now being scrutinised on a case by case basis.

4. Cooperative programmes are one of the major sources for the supply of defence goods, under specific agreements and the regulatory framework of international organisations, i.e. making use of the exemptions of Directive 81 Article 12 and the default priority of open competition in the EU market.

In conclusion, the level of application of the Directive 81 has steadily increased since 2013, nevertheless it is assumed that due to the number of possible exemptions and the cooperative set up of major development and procurement programmes in Europe it is not likely to increase a great deal more.
Global Outlook on the Defence Sector

Directive 81 has to be put in perspective with existing regulations and policies in force in countries outside the EU. Different legal frameworks are currently implemented in countries with a robust defence industry such as the United States of America through the US Government’s Foreign Military Sales (FMS) mechanism and the “co-production” rule (which also applies in other countries such as Australia), and in “emerging” countries (e.g. India, Brazil, Middle-East) through “offset benefits” provisions. In a “co-production” mode, the selling party commits to transfer manufacturing activities to the buyer (e.g. US approach on F-35 towards so called “partners”). In an “offsets benefits” scheme, the selling party agrees to execute part of the contract either through activities directly linked to the said defence contract (“Direct Offsets”) or in other domains considered as a priority for the country purchasing the equipment (“Indirect Offsets”). In both cases, the level of know-how and the value transferred by the selling party to the buyer are defined on a case-by-case basis and subject to local regulations (local added-value and offsets coefficients criteria).

FMS is the US Government’s programme for transferring defence articles, services and training to international partners and organizations. It is funded by administrative charges to foreign purchasers and is operated at no cost to taxpayers. The President designates countries and international organizations eligible to participate in FMS and the Department of State approves individual programmes on a case-by-case basis. The US government has full control over FMS, without reference to any external or supra-national bodies, which allows greater freedom than EU MS enjoy under D81.

International procurement organisations and agencies (e.g. NATO Support and Procurement Agency) represent another alternative option for nations’ defence procurement without opening a competition.

D81 could be perceived as an obstacle to defence procurement when compared to well-established procedures outside the EU environment and, consequently, EU MS might prefer to pursue non-EU partnerships.

If the offset mechanism was to be reduced or eliminated, as Directive 81 recommends, it could be regarded as a disadvantage for EU MS with limited research and technology (R&T) and industrial bases and capabilities, directly favouring transfer of know-how and technologies to emerging countries, to the detriment of the EU industry in the short, medium and long term. Those EU MS with limited capabilities could see this as Directive 81 leading to unfair competition. The European Space Agency (ESA) model, based on a geographic-return principle, whereby the amount invested by a national space agency in a project is returned to the country through a workshare in the project valued at the amount invested, might inspire the European Commission as a way to develop, promote and reinforce European cooperation as well as competitiveness towards the worldwide market.

(18) http://www.esa.int/About_Us/Business_with_ESA/How_to_do/Industrial_policy_and_geographical_distribution
One could also consider introducing a European equivalent of the 1933 "Buy American Act" for military procurement within the EU, restricted to member states. The "Buy American Act" applies to all U.S. federal government agency purchases of goods valued over a certain threshold, but does not apply to services. Under the Act, all goods for public use (articles, materials, or supplies) must be produced in the U.S., and manufactured items must be manufactured in the U.S. from U.S. materials.

Challenges Going Forward

There are several challenges going forward. They vary in nature and encompass political, economic, industrial, military and technical considerations amongst others.

From a political standpoint the 28 (soon to be 27 after Brexit) MS today do not have one harmonized view on many of the underlying issues within defence and security for EU. They often act from national security interests and concerns, tending to their own needs first, and considering the collective EU to a much lesser degree. This often leads to a disruptive and counterproductive climate to discuss, progress and decide on such issues as EU common defence force, EU defence planning, the need for joint capabilities, joint R&T, joint procurements etc.

Looking at deficiencies, the lack of a joint EU/MS operational capabilities analysis process with an associated aligned EU/MS budget process particularly stands out and remains an important prerequisite to find a solution to this. Without such mechanisms in place the chances of moving towards a more harmonized way of procuring R&T and capabilities seems slim.

Nowadays there is a lack of joint programmes for R&T and capabilities to which one can apply any new regulations or processes, making it difficult in the short term (3-5 years) to expect much progress in the Defence Fund "Windows". However, taking a longer-term perspective (10-15 years) it should be possible to find joint capability needs which could be agreed, like a Future Air Combat System, requiring R&T activities to comply with any new/amended regulations and processes.

Another important aspect is the export of defence goods from the EU. Export needs to have a globally competitive and robust European Defence Technological and Industrial Base (EDTIB). The internal market alone is not sufficient to secure freedom of action, Security of Supply, scale of economy and an appropriate level of strategic autonomy, because the EU demand is not sufficient to support a complex EDTIB. Hence common export control laws and regulations need to strike the right balance, weighing criteria for and against export approvals.

However, it is important for industry to have a functioning internal market, hence Directive 81 is considered to be essential. A SWOT analysis (Annex B) of Directive 81 reveals weaknesses and threats that create challenges going forward.

Possible Solutions

The committee 6 research during the SERA 29 course identified a number of measures that could improve the functioning of Directive 81, or further its aims by means which do not require alterations to the regulatory framework.

There are some relatively straightforward steps that could be taken to encourage more SMEs to bid in cross-border tenders: increase visibility of tenders by making information available on additional online fora (other than TED) and attempt to reduce the administrative burden involved in a cross-border bid by streamlining processes and providing online guidance. While it would be impractical to require nations running a tender to make competition information available in all European languages, particularly as there would not necessarily be the interest from every country to justify it, provision in a country’s national language plus a commonly agreed language (e.g. English) would limit the translation requirement for many ‘fringe’ countries if they knew tenders would always be available in a particular language.

Better protection of Intellectual Property (IP) at EU level, possibly by means of a set of voluntary guidelines, could also encourage greater involvement from smaller nations and SMEs as they would be less worried about having to take on major players to defend IP themselves. A more responsive system to address legal disputes more quickly, including a supranational escalation, would provide reassurance that a company could go ahead without the prospect of getting embroiled in costly and protracted legal proceedings. It would help, of course, if there were more of a common EU approach with fewer different rules and interpretations in MS.

It could be argued that limiting the exemptions allowed under D81 would increase the volume of defence procurement being handled under EU tendering processes with more business for European companies. However, any attempt to reduce exemptions or offsets would have to be handled carefully as some countries may be reluctant to have their options limited, as they might see it, and the fact that the exemptions exist could be what gives them the reassurance to engage in the process in the spirit of the directive, knowing they have an ‘escape clause’ when absolutely necessary.

The ESA model, with a common budget and national contribution based on economic power, produces tangible results for all ESA states and centralisation of activity reduces duplication. Creating a central EU defence agency responsible for capability development, as well as R&T programmes based on nation’s budgets, could provide similar benefits for the defence industry. Consideration should be given to conducting a benchmarking exercise against agencies and models within and outside the EU to identify best practice.
**Key Recommendations**

More cooperation is the single key factor which would promote a competitive European defence industry: between nations, pursuing common capability programmes to reduce costs to individual nations and increase interoperability; between NATO and EU, who share a common goal of maintaining international security and who could better address that if greater interoperability increased the options available in a conflict situation in any region; or between industry, research institutes or academia and defence agencies so that all can benefit from the achievement of outcomes acceptable to all, be that increased profits, improved knowledge or more suitable and ultimately more affordable capability choices. Some of these organisations for cooperative working already exist, such as OCCAR and the European Defence Agency, but they must be promoted and encouraged.

While we have already outlined a number of areas where defence cooperation could be improved by implementing existing regulations more effectively or introducing minor changes, our key recommendations to promote the desired competition are as follows:

1. **Harmonise regulatory frameworks to foster closer (NATO & EU) cooperation at an early stage in the procurement process**

   There would be great benefit in aligning efforts to address common capability gaps, both within the EU and between EU and NATO countries. Currently there is no process or framework in place. The aim would be not to duplicate capabilities but to produce a common strategy and tools to distribute work amongst nations (EU and non-EU). By identifying gaps and assigning responsibility at an early stage of procurement it would promote cooperation and foster competition. EDA (initial studies) and OCCAR (for defence development and procurement) may have a role to play in this coordination for EU, but any legislative change required to align frameworks would need to involve the EU. The collaboration environment needs to be in place (e.g. PESCO) and needs to be controlled (e.g. CARD).

2. **Support implementation of "Preparatory Action on Defence Research" (PADR) and increase innovation**

   Nowadays very few nations are able to allocate independently the investment required to develop capability programmes, so increased implementation of PADR[20], would bring economy of scale, making programmes affordable, but also spreading the risk and ultimately improving interoperability. It would require purchase timelines for programmes to be aligned to allow for common acquisition, but if modular options could be developed the nations could still tailor equipment to their own requirements while taking advantage of the reduced overheads associated with large volume production.

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[20] The budget for PADR related actions in 2017 is €25 million increasing to 500M Euro per year.
This common research approach should be encouraged from an early stage of capability development (prototypes, technical demonstrators) as it reduces duplication of effort and may drive innovation and promote a greater risk appetite, as there would be greater collective funds available with which to experiment. With a common pool of competences it may be possible to create centres of excellence (not necessarily geographical), allowing greater focus on certain technology domains, innovation and producing more effective results. Large economies of scale allow for budgets to be reallocated to innovation.

3. Improve knowledge of Directive 81

Government officials and industry representatives, not limited to SMEs, do not fully understand the requirements of Directive 81 and may not be aware of wider European programmes and legislation. There is a danger that this ignorance may lead those seeking to develop capability or procure equipment to rely on exemptions as a shortcut to avoid the "red tape", particularly if they are concerned about impact on timelines or equipment options of Directive 81 compliance. The European Commission and MS should provide better education to lower the barriers for participation and implementation of the Directive. This requires more proactive engagement with government and industry stakeholders, rather than relying on posting information on a EU website.

4. Create a central and common EU Market Place by improving information exchange

It can be difficult for companies to find all relevant information about competitions being run or for governments to discover which companies may be producing equipment or have the technology and expertise to meet their capability requirements. Steps should be taken to improve information exchange, with a market place organised by a central EU platform. This could be achieved by improving the EU tender website (TED), allowing SMEs to register their capabilities on there, and also ensuring that information on upcoming projects/programmes is updated regularly. To minimise administrative burden there could be different procedures depending on the different projects’ value levels, for example, not being compulsory for low value contracts and those below 10 million Euro requiring less detail than those above 25 million Euro etc.

5. Better follow-up by EU on Directive 81 implementation by nations

There is a perception that some nations may not be complying fully with Directive 81, but there has been reluctance on the part of EU institutions to tackle this. Reporting only came into effect in 2016 and should be used as a trigger to follow up implementation of the directive. No court action has been initiated to date despite the EC issuing qualified observations to several countries. The European Commission must be able and prepared to enforce the regulation and sanction nations that do not comply.

More regular audits should be conducted on medium and large programmes, with a smaller number of audits for randomly-selected small programmes. This may require more
resources or a dedicated agency within the EC to conduct the work. This would not only provide the evidence for the EU to tackle any instances of non-compliance discovered, it could also encourage compliancy simply because countries would know that they likely have to demonstrate compliancy during an audit.

6. Directive 43 should be implemented in all EU countries with greater harmonization

Countries are interpreting Directive 43 differently. The EC should ensure harmonized implementation across EU nations. It should consider supplementing the common list of controlled goods with a harmonized view of sensitive, military items rather than leaving interpretation open to nations (e.g. humanitarian situation in a certain country). It is very important that there are common, transparent rules for transfer of these goods throughout EU nations and regions, centrally monitored and controlled by the EU. A common understanding and joint view on export (if there is joint cooperation, etc.) should be established.

Conclusions

Committee 6 has come to the conclusion that Directives 81 and 43 provide an adequate regulatory framework, even in a changing environment. However, interpretation varies between MS, and the EC should do all it can to educate MS and establish harmonized implementation of the Directives, being prepared to take enforcement actions against MS if justified. More harmonized implementation, in line with the recommendations above, would promote greater defence cooperation across the EU.

Appendices

Annex A - Historical background on entities, treaties, frameworks and the like.
Annex B – SWOT analysis of Directive 81
ANNEX A. Historical Background on Entities, Treaties, Frameworks and the like.

The Organisation Conjointe de Coopération en matière d’ARmement (OCCAR) was initially established by an Administrative Arrangement signed by the Defence Ministers of France, Germany, Italy and the UK on 12th November 1996. The aim of OCCAR was, and still is, to increase the armaments cooperation of the MS in order to improve efficiency and reduce costs. In 1998, the Defence Ministers of the four founding MS signed the treaty-like "OCCAR Convention", which was subsequently ratified by the national Parliaments and came into force on 28th January 2001. The Convention gives OCCAR its legal status, allowing it to award contracts and to employ its own staff. Belgium and Spain joined OCCAR in 2003 and 2005 respectively.

The Letter of Intent (LoI) on the Framework Agreement (FA) Treaty was signed on 27 July 2000 by the Defence Ministers of France, Germany, Italy, Spain, Sweden and the UK. It aimed to create the political and legal framework necessary to facilitate industrial restructuring in order to promote a more competitive and robust European Defence Technological and Industrial Base (EDTIB) in the global defence market. It intended to address this aim through tackling 6 broad areas: security of supply, transfer/export procedures, security of information, research, treatment of technical information and harmonisation of military requirements. Each of these areas was assigned a sub-committee tasked with establishing common policies and overseen by the strategic level Executive Committee (ExCo).

The political, industrial and military landscape, however, has changed significantly since the LoI FA was signed in 2000. The European Defence Agency (EDA) was established in 2004, the European Commission has taken an ever closer interest in defence industrial and market issues and the defence industrial base has become increasingly globalised. Against this backdrop, the LoI nations agreed to adapt the work of the LoI in order for it to meet these new challenges, seeking to become an effective group able to:

- monitor and influence the European Commission
- provide advice and guidance to the EDA
- establish a more effective dialogue with industry
- work with third parties (other EU MS, US) to promote greater transparency and understanding of mutual defence industrial and market issues

(21) What is OCCAR? http://www.occar.int/185
The Loi ExCo has subsequently endeavoured to fulfil this ‘think tank’ role and re-orientate its work to these objectives.

The European Security Strategy\(^{(24)}\) was approved by the European Council on 12 December 2003. This was the first time that Europe had formulated a joint security strategy.

Another important step was the establishment of the European Defence Agency (EDA)\(^{(25)}\) by the European Council on 12 July 2004 as a Common Foreign and Security Policy (CFSP) body reporting to the Council of the European Union. The European Council established the EDA to support the MS and the Council of the European Union in their effort to improve European defence capabilities in the field of crisis management and to sustain the European Security and Defence Policy as it stands now and develops in the future. The EDA has four distinctive functions:

1. Development of defence capabilities in the field of crisis management;
2. Promotion and enhancement of European armaments cooperation;
3. Working to strengthen the Defence Technology and Industrial Base (DTIB) and for the creation of an internationally competitive European Defence Equipment Market (EDEM);
4. Enhancement of the effectiveness of European Defence Research and Technology (EDRT).

It is managed by three mechanisms:

1. Head of the Agency (currently High Representative Federica Mogherini) responsible for the overall organisation and functioning, ensuring the implementation of guidelines and decisions and chairing ministerial meetings of the Steering Board.
2. A Steering Board: being the agency’s decision making body, composed of the Defence Ministers of participating MS together with a representative of the European Commission and led by the Head of the Agency.
3. The Chief Executive: Head of staff and responsible for supervision and co-ordination of units (currently Jorge Domecq).

Amongst other things the Treaty of Lisbon includes clauses of solidarity and mutual assistance between EU MS when one or more are the victim of a natural or man-made disaster. When this happens all other MS have an obligation to provide all aid and assistance within their power. This matter relates directly to the Common Security and Defence Policy (CSDP) and has links to other provisions, like the possible framework for Permanent Structured Cooperation (PESCO) and the European External Action Service (EEAS) under the authority of the High Representative for Foreign Affairs and Security Policy.


\(^{(25)}\) https://www.eda.europa.eu/
Since it came into force in December 2009 the Treaty on the Functioning of the European Union (TFEU) has been the primary law of the European Union which all MS are legally bound to comply with. The TFEU contains rules and principles that MS must not act against or circumvent. Legislation at MS level must hence respect and comply with those rules and principles, thereby giving the EC additional legal powers in the defence and security area of the Union.

To give effect to the TFEU in different areas of the Union’s competence, the EU legislator (i.e. the European Parliament and the Council) adopts secondary legislation in the form of regulations and directives (the terminology, but not the substance, of certain legal concepts has changed with the Lisbon Treaty).
Annex B – SWOT Analysis of Directive 81

Strengths

✓ Single Process
✓ Should remove protectionism
✓ Should promote EU competitive industrial base
✓ Should develop cooperation between member nations
✓ Has exemptions for security (Art 346) which keeps member states engaged by ensuring freedom of manoeuvre
✓ Potential cost savings by member nations
✓ Specialization (specialists have access to an open market) and integration (brings entities together)
✓ All member nations have implemented Directive 81
✓ Supports visibility if tenders are advertised (industry has open visibility of tenders issued, via TED)
✓ Fosters cooperation of specialist SME with bigger primes
✓ Fights corruption, enhances business ethics

Weaknesses

✓ Lack of transparency
✓ Sub-contracting does not work well in practice
✓ Language barriers to overcome if bidding across borders
✓ Hard to have cross-border business
✓ Uneven implementation of the directive by MS
✓ Objective & intent of EC & MS is different
✓ Relatively unknown & complicated process for SMEs
✓ Directive 43 not working as it should
✓ Bureaucracy/ lack of agility
✓ Directive 81 does not cover the entire procurement cycle (i.e. only starts at tendering)
✓ Lack of sanctions when Directive 81 is not implemented
✓ It can be difficult for businesses from smaller nations to get into the process
✓ Threshold is too low for non-EU companies with a EU-"Post Box". This allows non-EU industries full consideration under Directive 81, undermining the original objectives of the Directive.
✓ Could offer an advantage to large companies at the expense of SMEs
✓ Greater competition reduces prices, reduces margins, which may be good for the customer, but discourages SME involvement in defence business.
✓ Directive 81 procurement takes more time and requires more interaction between bidder and contracting authority, i.e. costs more and bidder bears more risk
✓ Complexity can discourage small companies.
Opportunities

✓ SMEs can bid/join in cross-border tenders & have increased visibility
✓ Could close NATO & EU capability gaps
✓ Economy of scale (investments & sustainability)
✓ Directive 43 allows free flow of goods
✓ Transfer of knowledge and access to SMEs
✓ Cooperation
✓ Resolve international law issues
✓ Use of OCCAR and EDA (coherent rules & lessens admin burden)
✓ NSPA, UN Global Marketplace, as an example, could be used to establish a virtual European market place
✓ Increase in innovation
✓ ESA benchmarking - common budget and centralisation of activity could enhance cooperation and reduce duplication
✓ Can select good practice from different models (from different nations/agencies) and further develop the guidelines
✓ Improve promotion, awareness and education on possibilities offered by Directive 81 cooperation
✓ Establish technology clusters at European level

Threat

✓ Should promote EU competitive industrial base, but does not happen in reality
✓ Non-reciprocity with global competition puts EU companies at a disadvantage
✓ Brain drain and technology transfer
✓ Risk of monopoly of larger companies
✓ Commission creating extra bureaucracy in trying to fix the weaknesses
✓ Brexit and uncertainty about future of EU
✓ Consolidation of the defence market could pose a threat to SMEs.
✓ Immature procurement organisation for the application of Directive 81 (cultural, training)
✓ No audit trail or not equal audit for all nations