European Commission

EU funding for Dual Use

Guide for Regions and SMEs

Entreprise and Industry

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EU funding for Dual Use

A pratical guide to accessing EU funds for **European Regional Authorities and SMEs**

October 2014

Entreprise and Industry

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Introduction

Purpose of this guide

The relationship between the civil and defence worlds is intensifying and the dividing lines between them are becoming increasingly blurred. The armed forces and defence industry's dependence on technologies with a civilian origin is increasing, as is the tendency of the latter to diversify into civil markets. Meanwhile, civil companies are buying up technologies, such as robotics, which are also of interest to defence firms. It is clear that research and essential technologies, such as those relating to big data, synthetic biology, and 3D printing, will become an important source of innovation for both defence and civil industries. Against this background, the EU Heads of State and Government, meeting at the European Council[1] in December 2013, underlined the potential of dual-use research and development (R&D), products and services and encouraged the strong involvement of defence-related small and medium-sized enterprises (SMEs) in future funding programmes.

In the past, ministries of defence had a key role in funding research programmes and they often led industry efforts in technology, such as aeronautics. Today, that trend has been reversed: industry, pulled by civil market needs, has taken the leadershipin technology development in many domains. Governments face the challenge of finding ways to engage defence agencies in collaborating with the civil industry involved in research and technology development, while industry must seek to benefit from synergies across different sectors: civil, security and defence. This requires a new approach to business management and economic policymaking, be it at the EU, national or regional level.

The aim of this guide is to provide ideas, tips and guidance on how private-sector companies and public administrations could develop new dual-use strategies to respond to these challenges. Such strategies should help stakeholders move easily from one sector to the other or support the development of technologies and products able to respond to civil and defence needs. Companies can access new business opportunities thanks to public (regional, national, EU) support for market and product diversification and for projects that can bring benefits both to civil and defence industries.

National and regional authorities can support companies and research institutions in their diversification process by developing generic technologies that can have both civil and military applications (generating innovation, and seeking new research and business opportunities). By reducing segmentation between civil and defence applications, both industry and public authorities can contribute to innovation, drive down the costs of new defence programmes and maximise economic spillovers.

1/ Council Conclusions of 19.12.2013 — http://www.consilium.europa.eu/press/press-releases/latest-press-releases/newsroomrelated?bid=76&grp=24266&lang=en

Chapter 1 introduces dual use as a general concept both to regional authorities and business managers. Chapter 2 aims to help regional authorities to draw up their dual-use strategies, in particular in the context of the preparation for the use of European Structural and Investment Funds 2014-2020. Finally, Chapter 3 outlines how different EU funding tools could support SMEs in developing dual-use strategies and projects.

The impact of the EU defence-related industry

The EU defence industry has an important economic impact through its turnover (± € 100 billion), its efforts in R&D (± € 10 billion) and the number of people it employs (400 000 direct and 950 000 indirect jobs).

In July 2013, the European Commission published its Communication *Towards a more competitive and efficient defence and security sector*[2] noting the following specificities of the industry:

- it generates innovation;
- it is centred on high-end engineering and technologies; and
- it creates important indirect and spillover effects in other sectors such as electronics, space and civil aviation.

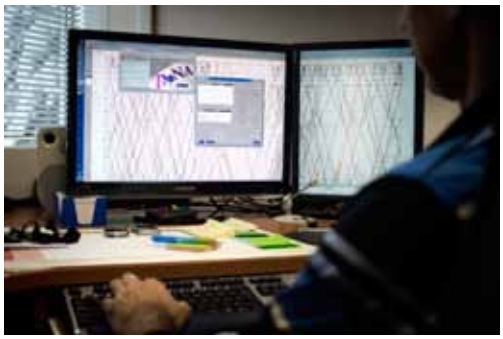
The Communication also highlights the impact of cutbacks in defence budgets on the purchase of goods and services, but also in defence R&D expenditure. To face this situation, a better exploitation of the dual-use potential of products, services, solutions and research and development and innovation (R&D+I) could provide a win-win situation for large companies and SMEs that are active both in the defence and civil sectors, as new opportunities for diversification arise. For the defence industry, new markets can be opened and civil industry can penetrate a rather closed market by scaling up their product and service ranges. It may indeed be less expensive for defence ministries to support product adaptation than to pay the costs of developing new products.

Dual use: a definition

Dual-use products, services and technologies can address the needs of both defence and civil communities. A large and increasing number of technologies are generic and not specific to single civil or military applications. Advanced materials, nanoelectronics, information and communication technologies (ICT), unmanned systems and automation or photonics are just a few examples of fields in which research, technology development and manufacturing can be used for multiple applications.

Dual-use technology transfer is the ability to adapt a technology developed in one sector (defence or civil) for use in the other (civil or defence).

2/ COM(2013) 542 final — See http://ec.europa.eu/enterprise/sectors/defence/defence-industrial-policy/index_en.htm



Generally speaking, there are two ways of developing dual-use products, services and technologies: an in-house process within an organisation (including spin-in); or an outsourcing process (licensing, joint venture, spin-off, start-up, inter-firm collaboration, etc., i.e. cooperation between companies, with or without the intervention of a facilitator).

Why should companies and public authorities care about dual-use products and technologies in their strategies?

Companies should have an interest because maximising the dual-use potential of their technology or their product range should increase turnover through diversification or upscaling their product range. By diversifying their activities, companies also have better resistance to economic cutbacks affecting their civil or defence activities. There are also potential benefits to be gained from supporting the start-up of spin-off companies or licensing some of their intellectual property, know-how, knowledge and technology to other companies or, finally, providing the knowledge to support spin-out creation.

Large companies can also find new ways to cooperate with a larger pool of SMEs in order to transfer and integrate innovative civil applications into defence applications.

Public authorities, especially at regional level, might be interested in facilitating the dual-use process in order to maximise their investments in R&D, to enhance niche specialisation or simply to support the sectoral diversification of regional enterprise with a view to sustaining activities or creating new jobs.

It is worth stressing that framework conditions, enterprise policies, R&D+I investments, innovative procurement, cluster support and tax relief all make a contribution to growth and job creation, but only if companies benefiting from those schemes are increasing their sales and revenue.

Ministries of defence can also benefit from a dual-use strategy. By increasing the pool of companies with dual-use capacities, they support the generation of more innovation and maintain high standards, even with a reduction of their investment budget. Ministries of defence could target future R&D spending to leverage commercial developments and avoid duplication of civil investment.

Both companies and public authorities should develop or adapt their strategies in order to enhance all the following types of dual-use transfer:[3]

- straight transfer (in-house or outsourced);
- adaptational transfer;
- licensing or collaborative agreements; and
- spin-off and spin-out creation.

3/ Cf. 'Dual-use technologies and the different transfer mechanisms' by Jordi Molas-Gallart, 1998. See http://www.ibrarian.net/navon/paper/Dual_use_technologies_and_the_different_transfer_.pdf?paperid=363818

2014-20 EU programming period: opportunities for dual use

EU funding instruments for the 2014-20 programming period can provide support — under certain conditions — to companies involved in the field of dual use. The European Structural and Investment Funds (ESIF), Horizon 2020, COSME[4] and Erasmus + programmes offer a range of opportunities to contribute to the design or implementation of action in the field of dual use.

- ESIF[5] can support technology transfer, market intelligence, proof of concept, prototyping, innovation uptake and training — many of the steps that help a business diversify or migrate from one sector to the other.
- Horizon 2020[6] offers opportunities to fund the civil application of projects with dual-use potential through the strands relating in particular to key enabling technologies, secure societies and ICT.
- The COSME programme offers opportunities to access some forms of funding for cooperation between clusters and for companies to build partnerships.
- A strand of Erasmus+[7] provides for industry-university collaboration.

For the 2014-20 programming period, the European Commission has prepared guidance on how to promote synergies between its various support instruments.[8] All EU companies can benefit from EU support for R&D+I and training activities (ESIF and Horizon 2020), while SMEs are also eligible for tailored instruments (COSME, Horizon 2020 and ESIF).

Based on the European Defence Agency[9] (EDA) SME Guidelines and Action Plan, work is ongoing on defence-related SMEs, with a particular focus on dual-use activities and cross-border cooperation, across the whole European defence supply chain.[10] Since 2013, the EDA has been helping stakeholders in the defence sector to access ESIF co-funding for dual-use projects by developing a methodology, raising awareness among defence stakeholders and by providing coaching support for pilot projects.[11]

4/ EU Programme for Competitiveness of Enterprises and Small and Medium-sized Enterprises (COSME). See http://ec.europa.eu/enterprise/initiatives/cosme/index_en.htm

5/ See http://ec.europa.eu/contracts_grants/funds_en.htm

6/ See http://ec.europa.eu/programmes/horizon2020

7/ See http://ec.europa.eu/programmes/erasmus-plus/index_en.htm

8/ http://ec.europa.eu/regional_policy/sources/docgener/guides/synergy/synergies_en.pdf

9/ The Agency aims at improving the European Union's defence capabilities through cooperative projects and programme. See also http://eda.europa.eu

10/ http://www.eda.europa.eu/procurement-gateway

11/ http://www.eda.europa.eu/info-hub/publications/publication-details/pub/factsheet-european-structural-funds-for-dual-use-research

CHAPTER I
Dual use: a means of enhancing competitiveness at company and regional level

Ministries of defence and national authorities can support dual use in several ways:

- funding part of the technology development of products and services that can at a later stage be shaped to penetrate both the civil and defence markets;
- selecting projects already developed for civil applications to become part of defence equipment or systems;
- accelerating the adaptation of civil technology to defence specifications;
- helping defence products and technologies to find civil applications; and
- better coordinating civil and defence research.

Ministries of defence could, for example, develop an understanding of the potential uses of additive manufacturing (or 3D printing) in a military context, engage with the research and supply base to influence the advancement of additive manufacturing, and evaluate how this could impact on the defence supply chain and long-term capability planning.[12]

Ministries in charge of the civil sector can also stimulate dual-use products, services and technologies by helping the defence industry design civil applications of their know-how or by financing dual-use R&D+I projects.

1. Concept

a. Business and regional competitiveness[13]

The competitiveness of a company depends on a variety of factors such as price, quality and availability of related services (packaging, distribution, maintenance, customisation, etc.). There are many ways to achieve a competitive advantage, including enhancing its business efficiency, accessing external funding sources, investing in human capital, using market intelligence, reviewing strategy, developing capacity to quickly adapt to customers' needs and to market opportunities, building partnerships and taking advantage of their social capital (networks).

Therefore, public authorities can intervene and offer support services, which can take the following forms:

- access to nearby infrastructures (incubators, laboratories, testing and measuring equipment, etc.);

12/ RAND Europe 'Future technology landscapes: Insights, analysis and implications for defence', 2013.

13/ Cf. 'Regional Policy for Smart Growth of SMEs' drafted by C. Saublens of EURADA on behalf of DG REGIO, 2013.

- counselling (business plan, innovation management, detection of barriers to innovation, internationalisation, etc.);
- funding (grants, guarantees, loans, venture capital, etc.);
- reinforcing human capital;
- intelligence (technological and market watch);
- networking;
- innovation demand (e.g., public procurement);
- technology/knowledge/know-how transfer.

b. Dual use: today's and tomorrow's markets

As mentioned above, dual-use technologies, products and services are those that can be applied in both the civil and defence industries. Some can serve both markets, possibly following adaptation. It is generally recognised that defence technologies, products and services have stricter security requirements than those designed for the civil market.

Therefore, technology adaptations may be requested to make a given technology, product or service fit for the other purpose. This may be done in-house by a company or may require the intervention of an intermediary organisation, e.g. a technology centre, a spin-off, or a technology/know-how transfer process. Defence products often have specific requirements that may be a barrier to an in-house dual-use strategy.

Dual-use technologies, products and services can be found in a wide range of sectors such as energy, ICT and telecommunications, automotive, materials, chemicals, aeronautics and space, marine, personal protection, security, etc. — in other words, the industrial basis or the smart specialisation priorities of many regions in the European Union.

According to the AeroSpace and Defence Industries Association of Europe[14], its members' turnover reached € 96 billion in the defence sector in 2012 (as compared with € 91 billion in civil activities), of which € 46.2 billion for military aeronautics, € 27 billion for land defence and € 21.8 billion for naval defence. Their R&D investment amounted to € 17.6 billion.

Large companies are often already active in the two markets, as shown in figure 1.[15] ▸

14/ http://www.asd-europe.org/.

15/ Source: The SIPRI Top 100 arms-producing and military services companies in the world excluding China http://www.sipri.org/research/armaments/production/Top100.

Figure 1 **European companies active in civil and defence production.**

Companies	Defence related sales (%)	Companies	Defence related sales (%)
Chemring group (UK)	96	Thales (FR)	49
BAE Systems (UK)	95	Eurocopter Group (FR)	46
DCNS (FR)	95	Fincantieri (IT)	42
Krauss-Maffei Wegmann (DE)	95	CEA (FR)	40
Nexter (FR)	95	Meggitt (UK)	39
Patria Industries (FIN)	91	EADS Astrium (FR)	34
Navantia (ES)	90	Diehl (DE)	33
CASA (ES)	88	Safran (FR)	30
Selex Galileo (IT)	88	Dassault Aviation (FR)	29
Saab (SE)	82	Rolls Royce (UK)	26
QinetiQ (UK)	67	EADS — Airbus (EU)	21
Finmeccanica (IT)	57	GKN (UK)	9
Alenia Aeronautica (IT)	55	IVECO (IT)	7
AgustaWestland (IT)	54	Thyssen Krupp (DE)	3
Selex Elsag (IT)	51	Fiat (IT)	1
Rheinmetall (DE)	50		

Source: SPRI 2012

Most defence-related SMEs have also become heavily dependent on the civilian market, with estimated civil sales ranging from 39 to 62 % of their total sales.

Dual-use products, services and solutions, including software and technologies, are defined in EU law as products and technologies normally used for civilian purposes, but which may have military applications.[16]

Annex 1 to Regulation (EC) No 428/2009 groups dual-use products and technologies in ten categories:

(i) Nuclear materials, facilities and equipment;
(ii) Materials, chemicals, micro-organisms and toxins;
(iii) Materials processing;
(iv) Electronics;
(v) Computers;
(vi) Telecommunications and information security;
(vii) Sensors and lasers;
(viii) Navigation and avionics;
(ix) Marine;
(x) Aerospace and propulsion.

Experts predict that, unlike the defence markets, civilian applications of many defence technologies will grow. This will particularly be the case for infrared cameras, 3C (communication, command and control), UAVs (unmanned aerial vehicles/drones), sensors and radio communication. In its *Defence Technology Strategy for the Demands of the 21st Century,*[17] the UK Ministry of Defence lists the following needs for technology: thermal imaging, radar, sensor, signal processing, com-

16/ Cf. Council Regulation (EC) No 428/2009 of May 2009 setting up a Community regime for the control of exports, transfer, brokering and transit if dual-use items. Published in OJ L 134, 29.5.2009. http://eur-lex.europa.eu/legal-content/En/ALL/?uri=OJ:L:2009:134:TOC

17/ Cf. http://trove.nla.gov.au/work/26039462

munication, human performance and training. All these fields allow for dual-use developments.

Defence companies are successfully diversifying into civilian security applications mostly in markets such as 3C, sensors, biometrics, screening and scanning.[18]

c. Dual use and key enabling technologies (KETs)

In the future, dual-use technologies will be developed thanks to key enabling technologies (KETs). Experts have drawn up a methodology to identify markets that will arise from cross-cutting KET developments.[19] The markets with the highest potential are in transport, healthcare, 'edutainment', security, textiles, chemicals and materials, energy and electronics.[20]

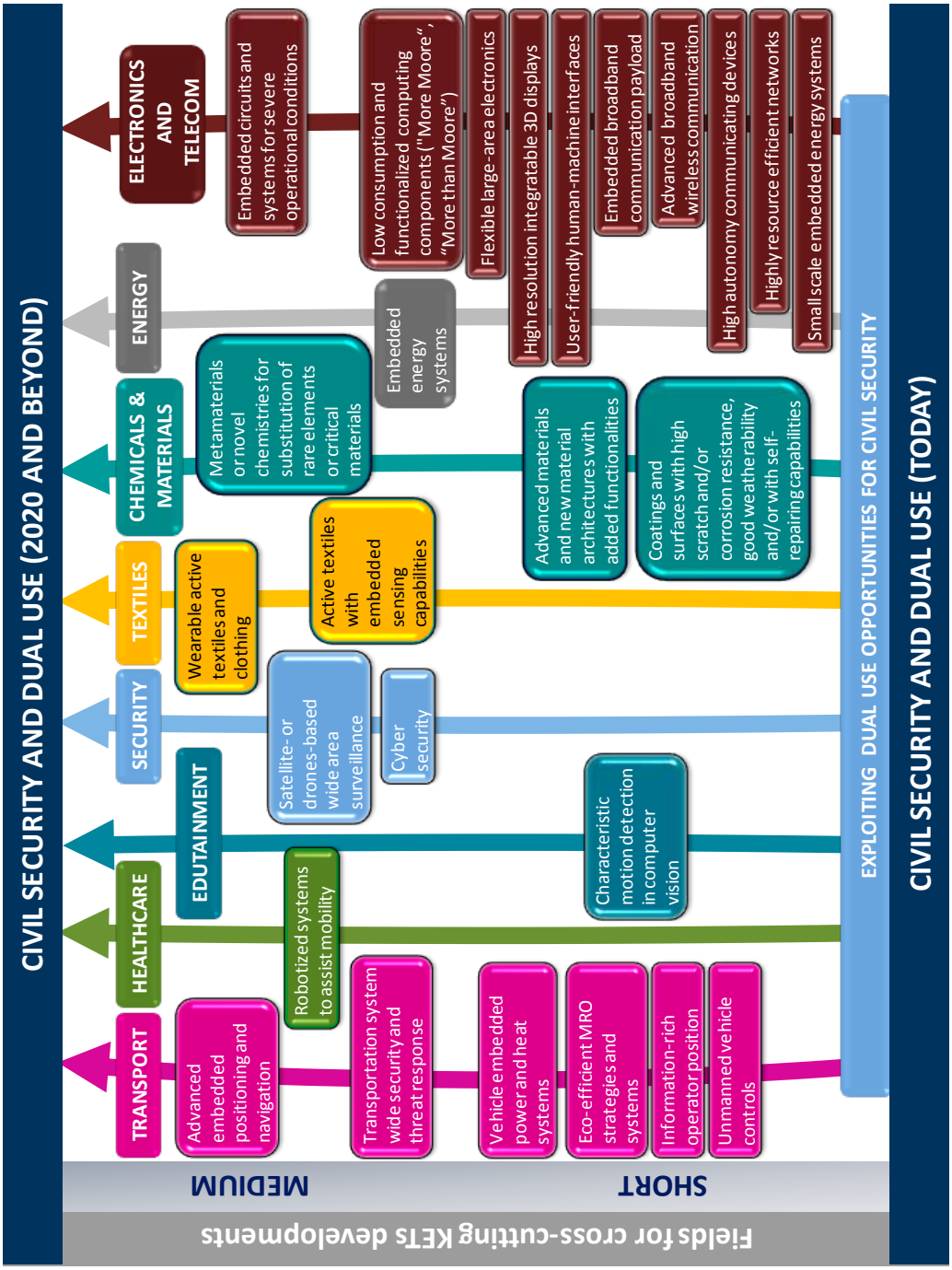
Figure 2 shows the time to market. Short-term markets still require up to five years' technology development, whilst the time needed to solve the main technology issues is longer for medium-term markets. ▶

18/ Qi3 Insight — Diversification by defence companies into civil markets: challenges, opportunities and strategic drivers, March 2013.

19/ 'Cross-cutting KETs' activities bring together and integrate different KETs and reflect the interdisciplinary nature of technological development. They have the potential to lead to unforeseen advances and new markets, and are important contributions to new technological components or products.

20/ Source: Roadmap for cross-cutting KETs activities in Horizon 2020, European Commission, 2014.

Figure 2 **Cross-cutting KET developments for dual-use technologies**



Source: Ro-cKETs study commissioned by European Commission

2. Dual use at company level

a. Diversification and upscaling of the production range

A dual-use strategy can provide benefits to companies by accessing new markets. This has various competitive advantages: creating a critical mass; introducing innovation; upscaling the quality of products and services; diversifying the product range; developing new relationships with other stakeholders; and engaging in collaboration with other companies, etc.

Companies willing to engage in a dual-use diversification process can do so by assessing the synergies arising from their technology and knowledge, in order either to use it to reach the frontier of the application in both sectors, or to spin off the technology developed in one sector into the other. They can also assess their product range in order either to use it in the other sector, possibly after adaptation, or to build sub-systems to be used in the other market. They can, of course, develop new technologies and products to respond to new needs. In such cases, companies have to look at the dual-use innovation process through its five phases: idea generation; innovation process; prototyping or pilot trial; demonstration; and market penetration.

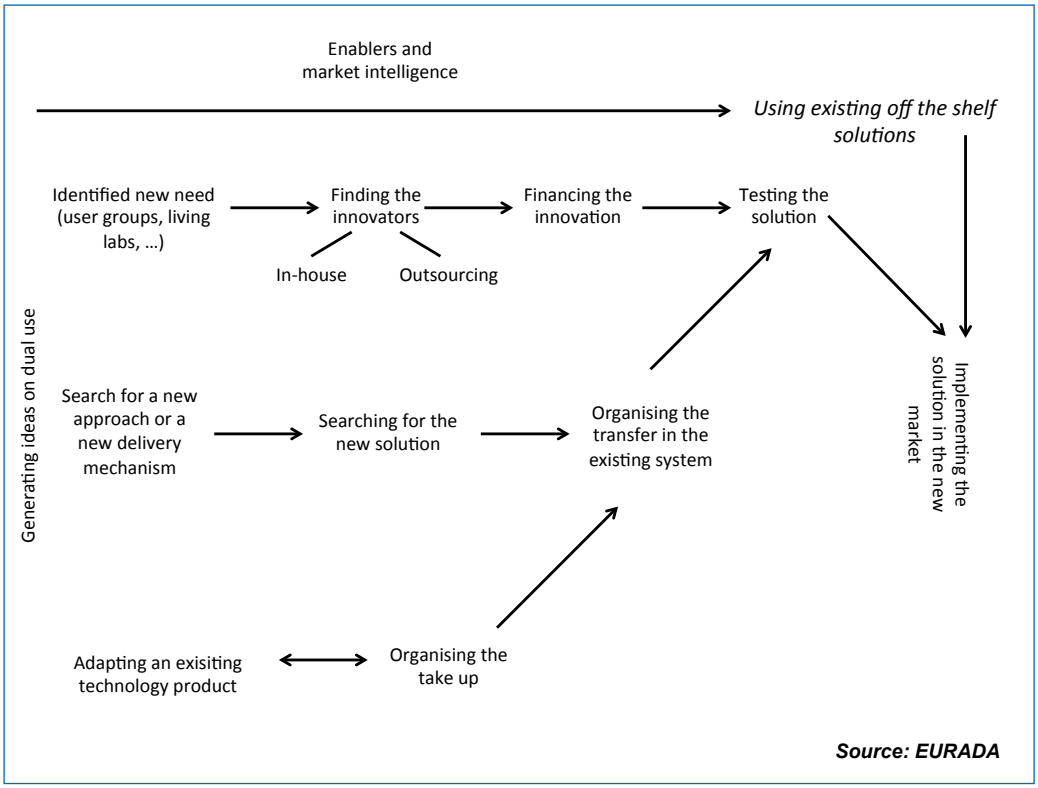
The issue of idea generation in the field of dual-use push is critical. It can be looked at from four different perspectives:

- identification of a need or an opportunity for a new application of an existing technology/product/service (civil → defence or defence → civil);
- search for a new or alternative solution to an existing challenge solved by an off-the-shelf solution (civil with defence technology or defence with civil technology);
- search for a solution to a new or emerging challenge based on dual-use potential; and
- transfer of an innovative experience developed in another environment.

Each of these approaches requires its own particular form of implementation in-house or with the support of external advisors. Each one can:

- involve the active participation of enablers (living labs, user groups, etc.);
- rely on the creativity of the companies or be outsourced to professionals (co-working spaces, open innovation, consultants, designers, etc.);
- require detailed market intelligence and knowledge to find a new niche for existing products/services/technologies; and
- require an open mind (sympathy for the 'not invented here' syndrome) and of course access to knowledge of innovative products/services/solutions.

Figure 3 Paths from needs or ideas to dual-use markets



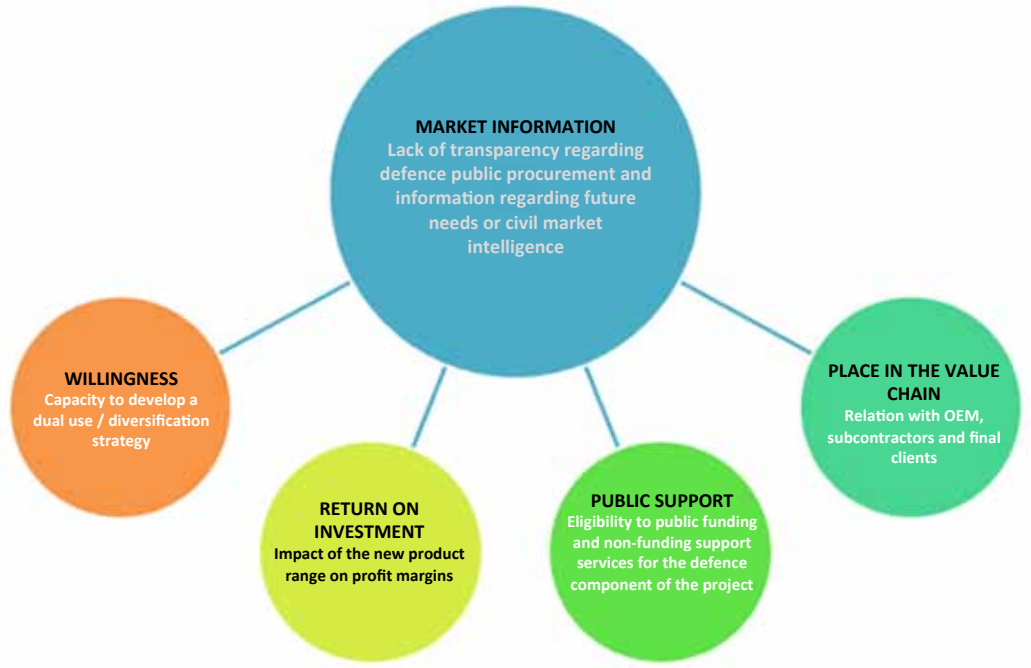
Intermediary organisations such as intellectual property portfolio consultancy firms play a useful role in facilitating the dual-use process. The advantages for companies of such sourcing of technology are, of course, lower development risk, reduction of R&D costs and faster time to market.

Companies, especially SMEs, can be reluctant to engage in a dual-use diversification process if they face or perceive market entry barriers and national preferences, business models and information asymmetry.

In the case of civil industry companies, the move towards a dual-use strategy may be hit by bottlenecks as regards, for example, market information, market size, procurement process and cycles, internal capacities, access to public support or position in the global value chain.

Since the market for civil applications of their products and services is likely to be more fragmented, defence industry companies may be concerned about the rate of return on investment and relations with potential customers.They might be forced to change business models built up over time in response to the needs of traditional defence customers.

Figure 4 Dual-use uptake: bottlenecks at company level



Source: EURADA

b. Large companies and SME cooperation

By their nature, defence markets are often beyond the capacity or scope of SMEs. The UK Ministry of Defence recognises that most of its contracts are valued at more than GBP 100 million. Therefore, SMEs will have to enter the large enterprise value chain to enter the defence market.

Large companies can develop new relations with SMEs by redesigning the way in which they purchase products and services or their outsourcing policy in order to involve a greater number of innovative SMEs.

SMEs should take advantage of recent trends in the field of innovation in business models (disintegration of the enterprise value chain, use of open innovation, outsourcing, co-development, etc.) and of advanced manufacturing (3D printing, robotics, new materials, etc.) to develop new types of relationship with large companies.

Large companies can take advantage of a pool of innovation dual-use SMEs that can be easily mobilised quickly to deliver new solutions and products and play a role in the implementation of any open innovation scheme.

Some defence companies have created a corporate venture fund to support and mentor start-ups and SMEs to invest in new technologies, products and services that they can use later (e.g. BAE's

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Investment in Innovation Fund). Other companies have put in place open innovation platforms to be connected with innovation providers (e.g. MBDA, in cooperation with Cranfield University).

Large companies can also develop partnerships with a regional intermediary organisation or with SMEs directly to offer unused intellectual property or knowledge to bring it to life and ultimately to market. This would be an interesting development of the open innovation concept for the field of dual-use technologies. Cluster organisations can play a leading role in this field by bringing together companies, especially SMEs, from different sectors and so help to enhance the dual use of technologies developed in the hosting cluster.

In 2007, the UK Motorsport Industry Association (MIA) established an initiative to help motorsport companies engage with the defence industry and so maximise business opportunities between the two sectors. Radiators, gearboxes, brakes, suspension components and seals are some examples of products for which applications have been found in the defence market.

3. Dual use at regional level

To maximise the benefits of the wide scope offered by dual-use markets, regions should map their capabilities in the defence and civilian industries.

Most EU countries and regions can carry out this mapping exercise on the basis of their clusters. Many can consider the design of a dual-use strategy. Nevertheless, a distinction must be made between regions with or without defence industry clusters.

a. Regions with defence-related clusters

Defence and security-related clusters, such as the Center for Defence, Space and Security (CenSec [DK]), EDEN (FR), Slovenian Defence Industry Cluster (SLO), AESMIDE (logistic support for armed forces [ES]), Gestion des Risques, Vulnérabililté des Territoires (FR), Madrid Securidad (ES) or System@tic Paris Region (FR), can of course constitute the core of a dual-use strategy moving from defence knowledge to civilian applications. An EDA database lists around 100 clusters and similar organisations already active in or related to the defence industry.[21] Organisations not yet registered are welcome to join the EDA community.

b. Regions without defence-related clusters

Aeronautic, space, transport vehicle and ICT clusters can by nature develop dual-use applications. Regions with industrial clusters producing components that can be integrated in civil and defence products, services and equipment, such as new materials, sensors, optics, photonics, mechatronics, etc. have opportunities to implement a dual-use strategy.

These regions need to assess the potential of their portfolio of civil businesses to be engaged in a dual-use strategy. This can be done by providing assistance to intermediary organisations, and to civilian technology cluster managers, to develop a collective market intelligence to explore the cross-fertilisation and competitive advantage that regional enterprise can build or to involve non-defence clusters in a di-

21/ Cf. European Cluster Observatory http://www.clusterobservatory.eu/index.html and EDA Directory of regional/ industrial portals and clusters http://www.eda.europa.eu/procurement-gateway/information/industry-rto-directory/regional-industrial-portals-clusters

versification process. In the past, some automotive clusters (e.g. in Catalonia[22], and in the UK's West Midlands) have successfully done this in times of crisis (in the case of the West Midlands, when the Rover plant was shut down[23]) and with ERDF and ESF funding.

The most obvious path for those regions is to help their enterprise organisations or clusters identify markets with similar requirements as regards technology, platforms, sub-systems, production equipment or R&D in order to provide the right support to enter those new markets.

Of France's 71 *poles de compétitivité*, nine are considered as developing activities relevant for the defence ministry[24]. These poles are active in aerospace (3), optics-photonics (3), maritime areas (2) and complex systems (1).

Altogether, there are probably more than 200 clusters in Europe that could be covered by a dual-use strategy.

Regional authorities should map the competencies (R&D+I and production) of each cluster. The main challenges of cluster organisations will be market intelligence on common requirements and product adaptation, and 'inter-clustering' activities.

Some regions already have in place elements to support cross-fertilisation, mostly between the civil and defence industries. In Aquitaine and Bretagne, this is achieved through technological platforms, in Jyväskylä (FIN) mainly in the field of ICT, and in Scotland and East Netherlands at company level, through the intervention of the account manager and through 'pitch and match' meetings, respectively.

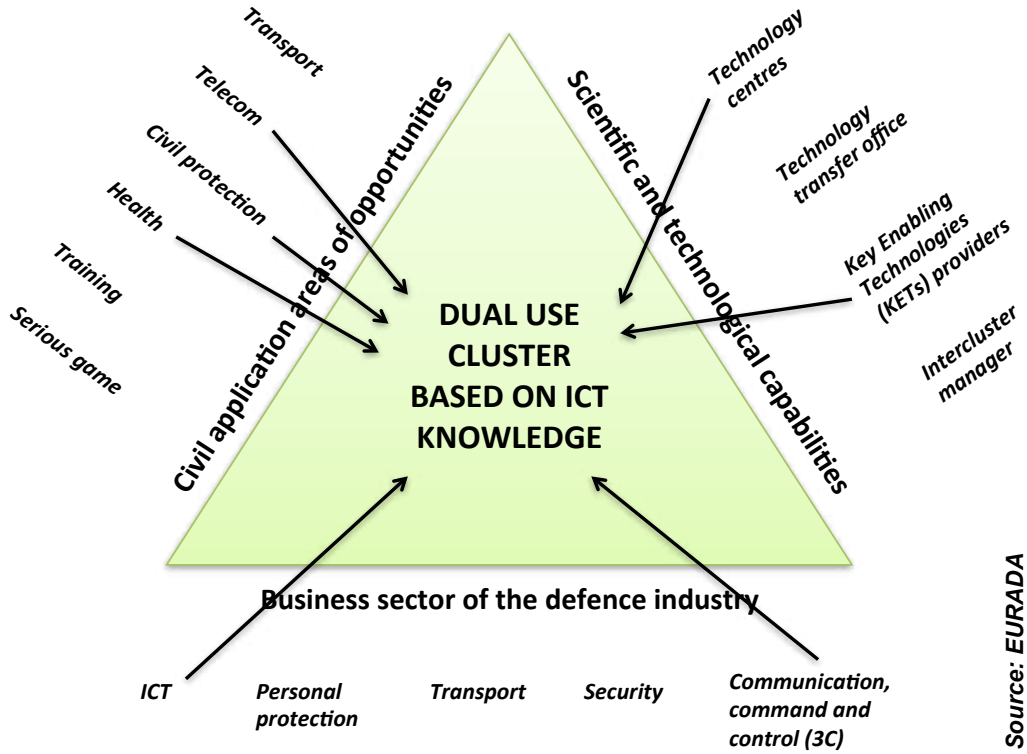
Each type of cluster will have to find its own rationale to identify its assets and competitive advantages to engage in dual-use diversification and to lobby its regional or national policymakers to provide them with the right type of public support to be successful in such an exercise.

22/ Source: EURADA Survey: Re-building regional economy. Panorama of tools and actions undertaken by RDAs. Eurada-News Nr 303, 2.11.09

23/ In the case of MG Rover, EU funds cofinanced schemes to offer workers training opportunities and enterprises support in order to help suppliers to move from their dependence on MG Rover into sustainable businesses. Cf. European Foundation for the Improvement of Living and Working Conditions. EMCC Case studies: Managing large-scale restructuring MG Rover

24/ Cf. http://www.ixarm.com/Les-Poles-de-competitivite

Figure 5 **Potential for dual-use inter-clustering action**



c. Which public support tools for which objectives?

Dual use can be supported by public authorities through a variety schemes or support services that can provide:

- support for the transfer of existing defence products and technologies to civil applications, possibly after adaptation to civil requirements;
- support for the transfer of existing civil products and technologies to defence industry needs, possibly after adaptation to defence requirements; and
- investment in the development of new products and technologies with a great potential to serve both civil and defence markets.

The move from one sector to the other can be supported through various tools, such as:

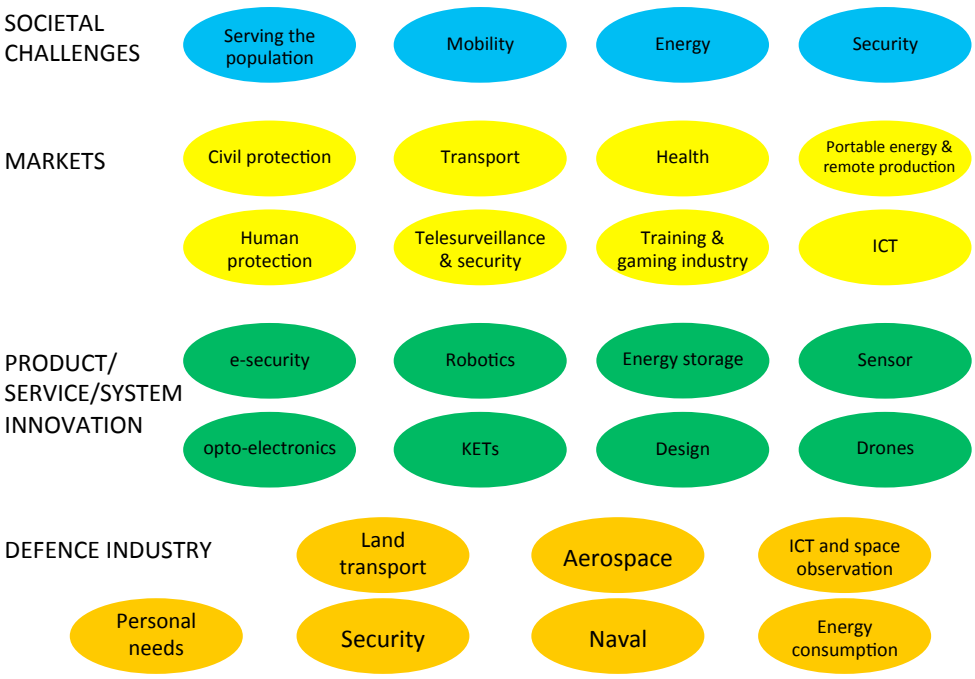
- market intelligence and competence mapping;
- technology/knowledge transfer;
- technology/knowledge adaptation and absorption;
- spin-off or joint venture creation;
- matchmaking between technology holders and technology seekers;
- networking and internationalisation activities between stakeholders.

First and foremost, regions have to be able to collect and assess data on the capability and willingness of local businesses to diversify their product range, and on market intelligence. The following set of questions helps collect the necessary data to undertake such analysis.

1. Which companies are already active in one of the two sectors? What is their product or service range? What is their position in the sectoral value chain? Are they already organised in clusters or in similar networks?
2. What challenges for the defence and civil sectors can be solved through dual-use technologies and products or solutions in order to orientate public research funding and development or innovation schemes?
3. Which products/services/technologies available in the region/country can be adapted to fit the demand of the civil or defence sector?
4. Which intermediary organisations (universities, technology transfer offices, demonstration centres, sectoral centres, clusters, industry clubs, etc.) can be involved in a dual use strategy?
5. What entry barriers should or can be removed locally to help companies penetrate the dual use market?
6. Are existing public enterprise support services and strategies used to support dual-use applications? If so, which, and who are the users? If not, how should they be reshaped to fit the dual-use needs?
7. How to build a portfolio of strategic companies for the dual-use strategy in order to understand the SWOT position (strengths-weaknesses-opportunities-threats) of each vis-à-vis a dual-use strategy?
8. How to develop inter-clustering activities at regional and trans-regional level to promote dual-use products/services/technologies at cross-sector level?
9. Which organisation is best placed to steer and lead a regional or national dual-use strategy?
10. Which sectoral technology centres help companies demonstrate in real working conditions the ability of their product range to serve dual-use needs?
11. How should pre-commercial procurement projects be used to bring together civil and defence industry procurers to define future needs that can be met by dual-use technologies or products?

Figure 6 gives an idea of how regional authorities might develop a map of the market opportunities for a dual-use regional strategy. ▶

Figure 6 How to identify the regional potential for dual-use products and technologies



Source: EURADA

The move from defence industry to civil markets requires less sophisticated support services, but it is advisable also to look at how to respond to local market needs in less-developed and emerging countries.

When developing a dual-use strategy, public authorities should take into account the position of local companies in the defence industry supply chain, which is increasingly divided between various tiers of subcontractors (▸ see Figure 7). They should take into consideration the fragmentation of business functions in the global value chain (▸ see Figure 8).

They should also bear in mind that original equipment manufacturers are seeking to lower the number of suppliers and that SMEs have to support higher technical, manufacturing and financial risks, in response to which they must be able to invest in new industrial and cross-sectoral processes. Proper financial support must be put in place to help regional SMEs move up in the value chain.

The challenges faced by SMEs (not only defence-related) generally come under the responsibility of different government authorities (usually the ministry of economy/industry). However, a number of Member States, such as the UK and France, have established concrete support plans and actions to assist defence-related SMEs.

The UK Ministry's action plan[25] sets out as a main objective encouraging and increasing SME par-

25/ UK Ministry of Defence SME Action Plan, October 2013.

ticipation in the defence industry. To do so, it focuses on the current value chain and encourages prime contractors to revisit its composition in order to optimise SME involvement. This involves an exchange of information as to where subcontractors are based, the nature of the products and services acquired and the value of contracts.

In France, the Pacte Défense PME lays down the defence ministry's commitment to supporting SMEs and intermediate-sized companies (ETI). This strategy for SMEs and ETIs involves 40 measures addressing significant issues such as access to public procurement, support for innovation, financing and export. Support for SMEs' dual use innovation is imperative for the ministry and for the economic development of companies constituting the defence technological and industrial base.

The EDA plays an important role in identifying and sharing Member States' best practice in support of SMEs, such as defence ministries' SME action plans, and encouraging their implementation at European level. EDA guidelines on SMEs contain various suggestions as to how Member States could support their defence related SMEs.

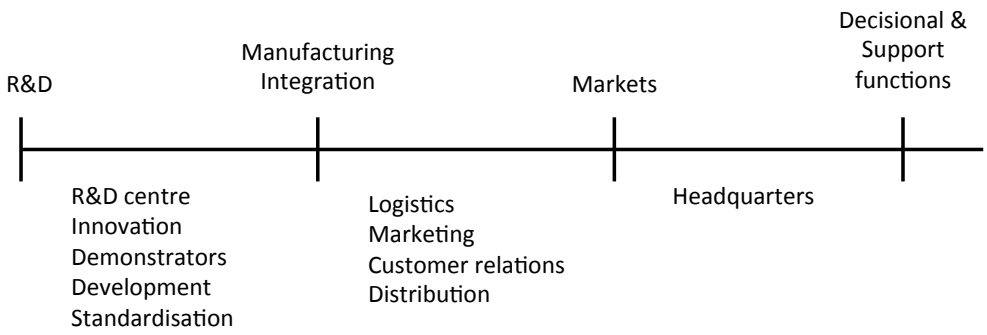
Figure 7 **Place of regional subcontractors in an industrial supply chain**

Prime contractors	**• Lead system integrators • OEM (Original Equipment Manufacturer)**
Tier 1 - Contractors	• specialised system providers • complete sub-system producers
Tier 2 - Contractors	• equipment • engineering • material working • niche expertise
Tier 3 – Contractors	• community suppliers • general service suppliers • basic economic infrastructure

Source: inspired by BIPE

For the defence market, public authorities should provide mechanisms allowing local companies to be more international in order to be able to cope with the international fragmentation of the industry value chain and the lack of national and European programmes. They should also help Tier 2 and 3 SMEs join forces in order to offer (sub-)system solutions instead of just product solutions. It is worth remembering that national suppliers still have a dominant position in most large defence industry markets in the EU (FR, UK, DE). They are often integrators and usually have a national network of suppliers. Foreign companies need to demonstrate strong competitive advantages in order to be accepted in such value chains.

Figure 8 **Enterprise function and value chain in a global world**



Where are the enterprise functions located?
- in-house
- offshored/purchased/subcontracted
- in the region/in the country/in EU28/somewhere else in the world

Source: EURADA

4. Dual use and research centres

Defence research centres, such as the UK Defence Science and Technology Laboratory (Dstl), the Swedish Defence Research Agency (FOI) or the Norwegian Defence Research Establishment (FFI), have already outsourced their knowledge and technologies for civil use. They are involved in projects under the seventh research framework programme (FP7) or even in the LIFE+ programme. SIA Lab (Système d'Information des Armées), linked to the Direction générale de l'armement, allows the French defence ministry quickly to access civilian innovative ICT to be used for defence applications.

In the UK, Ploughshare Innovations (http://www.ploughshareinnovations.com) offer a portfolio of technologies originally developed for defence and security purposes by the UK Defence Science and Technology Laboratory (Dstl).

Civilian research centres, such as the Fraunhofer Institute for Communication, Information Processing and Ergonomics (FKIE), recognise the opportunities opened up by dual-use technologies and have integrated them in their core business. In France, the Agence Nationale de la Recherche, in partnership with the Ministry of Defence, launched the ASTRID-Maturation Programme to boost dual-use innovation by supporting technology demonstrations and pre-industrial activities.

CHAPTER 2
Designing public support schemes to enhance dual use

1. How can public authorities influence the dual-use process?

Public authorities at national or regional level should draw up a strategy to enhance dual use through the provision of direct support to R&D+I activities or indirect support for the transfer of applications from one sector to the other. A prerequisite for any indirect support scheme is a good understanding of the markets in order to establish what type of adaptation is required to fit the purpose of the new market. As defence products, processes and solutions are perceived as rather small niche markets — more sophisticated and expensive than those for civil uses — players in the defence industry may face price handicap and mass production challenges, while civil players may face challenges on quality and standards. Public support services should help companies overcome these challenges.

Public authorities can influence the innovation process either by their purchasing power or by the design of R&D+I schemes. Where using their purchasing power, they can either buy off-the-shelf solutions or issue innovative tenders. In this respect, this means using an innovative tendering process (negotiated, pre-commercial procurement, etc.) or procurement to purchase innovative products, as well as supporting public-private partnerships. By doing this, public authorities, including regional authorities, will help companies anticipate or take advantage of the changing environment of the defence industry and of opportunities arising from the development of dual-use markets. Any strategies in this field have to take into account regional public and private assets. Figure 9 presents the ingredients of such a regional dual-use strategy. ▼

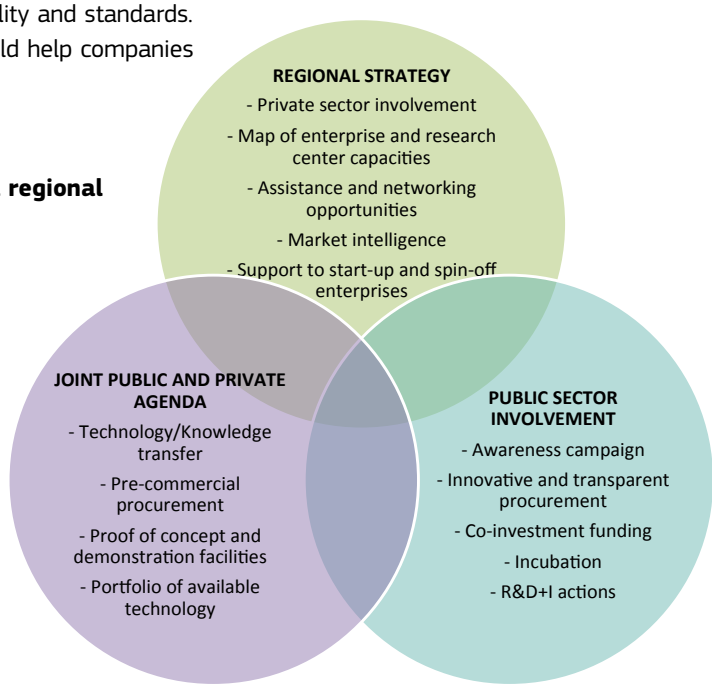
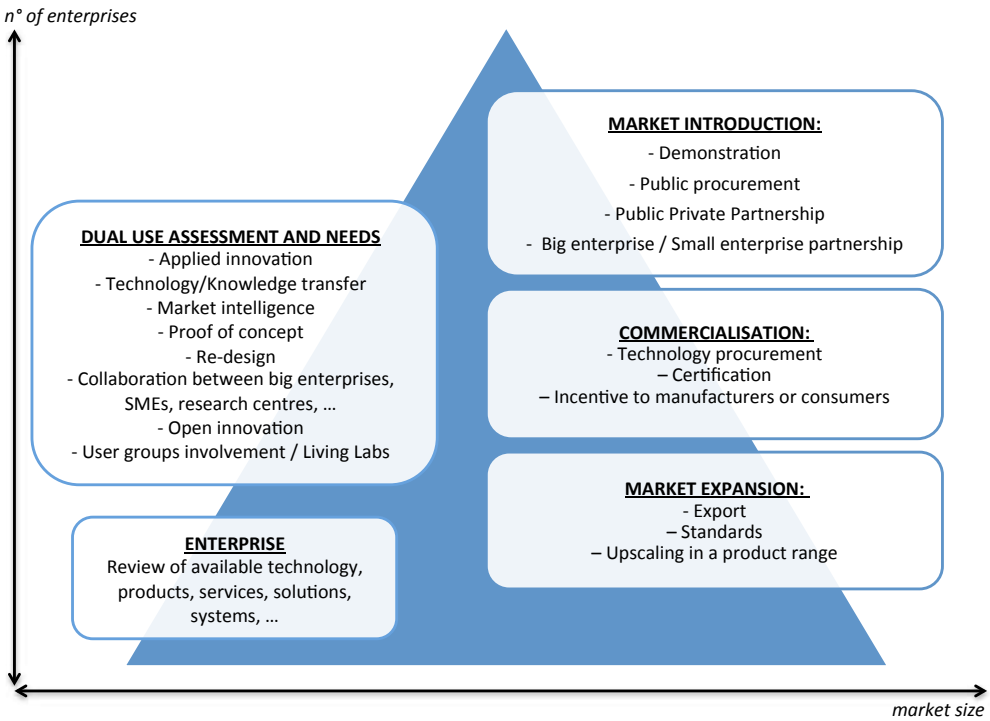


Figure 9 Ingredients of a regional dual-use strategy

Source: EURADA

Such strategies need to track transition of companies from one market to the other. To help this shift, public authorities should construct an ecosystem based on the following elements:

Figure 10 Dual-use discovery process



Source: EURADA

2. Direct support

a. Dual-use R&D+I scheme

Public authorities or research & innovation funding agencies can design calls in order to support the development of dual-use technologies.

In France, the Rapid[26] scheme has been put in place by the Ministry of Defence with the aim of detecting and nurturing radical innovation projects and providing support to SMEs that develop dual-use technologies. The support takes the form of a grant up to a maximum of 80 % of the project cost and of coaching support from an expert of the ministry. The 2014 budget amounts to € 45 million vs. € 9 million in 2009. To date, 253 grants have been allocated. In the United Kingdom, the Centre for Defence Enterprise[27] is providing support for the same purpose.

If public authorities are reluctant to provide funding for R&D+I activities in the defence sector, they can support the common part of the dual-use product development based on the Technology Readiness Levels (TRLs) below.

26/ http://www.service-public.fr/professionnels-entreprises/actualites/00521.html
27/ http://www.science.mod.uk/engagement/enterprise.aspx

Figure 11 **Revised Technology Readiness Levels (TRLs)**

TRL 1	2	3	4	5	6	7	8	9	10	11	12
Basic principles observed	Technology concept formulated	Experimental proof of concept	Technology validation in lab	Tech valid. In relevant environment	Demonstration in relevant environment	Demonstration in operational environment	System complete and qualified	Successful mission operations	First client/user/taker	National market maturation	Export and internationalisation
Phase 1: Fundamental research	Phase 2: Technological research			Phase 3: Product demonstration				Phase 4: Competitive manufacturing	Phase 5: Market penetration		

Source: Adapted from COM (2012) 341, A European Strategy for Key Enabling Technologies — A Bridge to Growth and Jobs

In fact, three scenarios can be envisaged:

① the dual-use content is common from level 1 to 6 and thus can be supported. Level 7 and the market uptake will be supported only for its civil part;

② a defence industry technology or product can find a civil application thanks to investment as from TRL 6. In that case, only TRL 6 to 9 will be funded;

③ a civil industry technology needs further research to find an application in the defence market. In that case, the funding might be subject to ethical considerations.

b. Enhancing human capital

Public authorities have a role to play in helping companies adapt their workforce and skills in order to exploit the opportunities offered by dual-use technologies, products and services. The support can include vocational training, entrepreneurship in case of technology spin-out or student and academic outplacement. Public authorities can also provide access to specialised temporary

counselling expertise in order to increase the innovation and export management capacity of the company. Voucher schemes can be useful for such purposes.

c. Access to funding

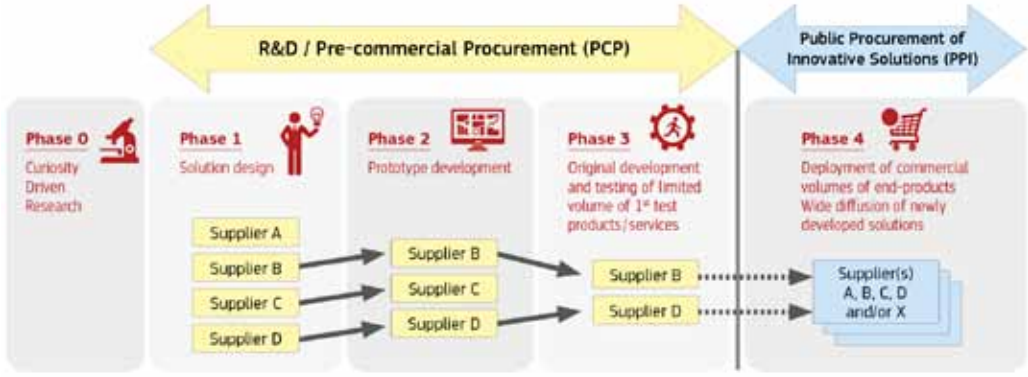
In order to help companies and research-driven organisations acquire the knowledge and to realise the necessary investment to shift from one market to the other, or to develop a new dual-use product range, regional and national authorities can offer different forms of finance, such as

grants, loans, guarantees or public equity. They can also provide access to seed capital for start-ups and proof-of-concept funding to teams of researchers.

d. Pre-commercial procurement and public procurement of innovation

Public procurement is a powerful tool to stimulate innovation and create new or lead markets. This can be the case for dual-use technologies, products and services. These two procurement approaches share — between the private and the public sectors — the costs and risks of carrying out innovation when looking to find answers to problems for which there are no off-the-shelf solutions. The European Commission has been supporting procurer organisations since 2009 to test tools for pre-commercial procurement and public procurement of innovation[28]. It is worth recalling that the UK Ministry for Defence has been a pioneer in this field. The power of the systems can be demonstrated by the fact that some UK solutions have been exported to the USA. This is the case, for instance, of Intelligent Textiles, which had proposed an 'eTextiles' light uniform within the framework of the Small Business Innovative Research[29] scheme.

Figure 11 **Steps for the design of a process to launch a pre-commercial procurement and a public procurement of innovations**



Source: https://ec.europa.eu/digital-agenda/en/innovation-procurement

3. Indirect support

a. Prerequisites

The first thing public authorities should put in place when designing a dual-use strategy is support for the creation of an intelligence observatory. Through this, companies and research & innovation centres can assess if their products, services and solutions or technologies can find, as such or after improvement, an application in the other sector. The intelligence to be developed needs multidisciplinary expertise in order to provide an exhaustive overview of potential applications. This structure should seek partnerships with intellectual property rights (IPR) centres or advisors as well as designers and defence industry procurers.

This observatory must have a good knowledge of the capacities and product range of regional

28/ https://ec.europa.eu/digital-agenda/en/innovation-procurement and https://www.innovation-procurement.org

29/ The SBIR scheme enables the UK Government to engage with industry and to act as lead customer.

businesses in order to identify which sub-market of the defence or civil sectors they have to look at. Such an observatory can become one of the core businesses of any sectoral clusters or can lead to the creation of an ad hoc dual-use cluster. It could become a standalone organisation[30] in the regional panorama of intermediary organisations. It can also be integrated in the portfolio of activities of a regional development agency.

b. Business segmentation

Public authorities need to develop a market segmentation of the portfolio of companies in order to target those which might benefit from their dual-use strategy.

The segmentation should be based on the following criteria:

- past experiences, i.e. companies with a track record in innovation or in diversification activities;
- hidden potential for market diversification, product development or know-how transfer;
- would-be qualified beneficiaries, i.e. companies able to demonstrate their capability to move from one sector to the other.

Specific measures will be put in place for each of the three categories in order to increase the dual-use turnover, market share or market penetration. First of all, the support will take the starting point of the beneficiary into consideration. The defence industry trying to enter the civil industry will indeed be confronted by other types of challenge than companies wishing to move from civil markets to defence ones. Second, we should consider the position of the potential beneficiary in the market value chain. Are the companies in the position of an 'original equipment manufacturer' or in the second or even third tier of the subcontracting chain? Finally, are they agile enough to move alone between sectors or do they need external support to adapt their technology, product and service range to enter the new market?

Segmentation of regional businesses	Type of support
Experienced company	• Market intelligence in the field of technology/product/service adaptation and redesign as well as standards • Internationalisation • R&D+I for new development • Spin-off support
Companies with hidden/sleeping potential	• Market opportunities • Technology intelligence • Innovation support
Would-be dual-use companies	• IPR acquisition • Start-up finance • R&D+I commercialisation support • Market validation • Proof of concept • Support for demonstration • Incubation

30/ Cf. CenSec in Denmark.

c. Outsourcing the technology or product range

If companies are not themselves interested in marketing the technology, product or service having a dual-use potential, they can of course outsource their knowledge and know-how. This requires different tools to help the matching of knowledge-holders with potential knowledge-users. Besides, the valuation of IPR and the negotiation of a restricted use of the knowledge might constitute brakes to a great interest for this means to promote dual use.

This way of supporting dual use needs a broad stocktaking of the technologies and products having a potential to be outsourced as well as a brokerage system to reconcile supply and demand.

In the USA, the Department of Defence has awarded US$ 1 million to the Arizona State University[31] to support technology transfer and civil commercialisation from federal government laboratories. The Arizona State University bases its strategy on providing support to start-up creation. The outsourcing system will probably need to be adapted in order to fulfil market needs. Regional authorities can involve their higher education institutions and technology centres to help companies — especially SMEs — successfully engage in the adaptation process.

Instead of selling the knowledge on a business-to-business (B2B) basis, public laboratories and companies can enter into strategic partnerships through which they work together to adapt the technology or products to new markets.

The natural way of outsourcing technologies is either licensing or spin-out in order to favour a start-up creation.

d. Matchmaking events

One of the critical issues for innovative companies — especially SMEs — is to get a first order for their new product or service. Matchmaking events, where purchasers meet with innovators, can help in this field. Meet-the-buyer fairs are powerful tools if well designed.

Public authorities can consider supporting such fairs at local or national level. The European Defence Agency (EDA) could promote a pan-European initiative with a professional organisation and a certain number of regions and Member States and launch a ‘defence & civil’ meet-the-buyer fair similar to the Aeromart event organised every two years since 1996 in Toulouse. A total of 1200 companies, mainly SMEs, took part in the last event in 2012, when 45 countries were represented.

31/ Cf. http://sdsi.asu.edu/asu-named-dods-technology-transfer-center-of-excellence/

The concept of meet-the-buyer fairs is based on a catalogue of demand and supply for products, technologies and capabilities, which serves as a basis for pre-identified 40-minute individual meetings between relevant contacts.

A meet-the-buyer fair in the field of dual-use industries could target procurers, buyers and producers in sectors such as defence industry, security, civil protection, health, ICT, individual protection, energy, earth observation, new materials and robotics.

National and regional authorities can of course support smaller matchmaking events that promote relationships between various stakeholders involved in dual-use industries.

e. Specific support for defence solutions to be used in civil markets and vice versa

The best way of developing services for sector diversification, starting from competences in a given sector, is to analyse the internal value chain of a company in the light of its business functions.

The list below suggests what could be proposed by any public support scheme aiming at helping companies undertake a sector diversification strategy.

BUSINESS FUNCTIONS	SUPPORT SERVICES FOR DIVERSIFICATION
Research	**Research projects and joint research** **Access to equipment and expertise**
Innovation	**Joint development** **Proof of technological concept** **Proof of economic concept** **Licensing and transfer of intellectual property/know-how** **Spin-out creation**
Production	**Establishment of production facilities** **Subcontracting** **Outsourcing / offshoring** **Sub-system provider**
Marketing	**Market testing / economic intelligence** **Support to find a first client** **Pre-commercial procurement** **International outreach**
Funding	**Grants, guarantees and loans** **Joint venture** **Initial public offerings (IPO)** **Access to investment funds** **Merger and acquisition**

Public authorities can organise a wide range of events, such as symposiums, road shows, meet-the-buyer events, to help SMEs become familiar with defence markets. They can also simplify their procurement procedures and provide early information of their procurement intentions.

Due to national fragmentation of the defence industry and of part of the civil industry covered by dual-use products, public authorities also have to encourage the adoption of internationalisation strategies. They may provide financial services (export guarantees, loans, subsidies, etc.) and other services (training, foreign trade missions, market intelligence, etc.) or even a mixture of both (soft landing). The main issues faced by SMEs when they are thinking about engaging themselves in internationalisation activities are: market knowledge (export existing products and services or adapt them to local needs,...), presence in the country (sales agents, joint venture, foreign direct investment FDI, ...) and the risks encountered (costs, insolvency, late payments, exchange risks, ...).

On top of support to individual companies, support can also be provided to cluster organisations or similar enabling organisations. In some cases, large companies can be good mentors for SMEs.

f. Dual-use incubators

Public authorities might inspire themselves through the ESA[32] Business Incubation Centres,[33] which aim '*to inspire entrepreneurs to turn space-connected business ideas into commercial companies, and provide technical expertise and business-development support for using space technologies or developing applications to create products and services in a non-space environment*'.

As of early 2014, nine ESA Business Incubators are in operation: Noordwijck (NL), Darmstadt (DE), Roma (Lazio, IT), Gilching (Bavaria, DE), Harwell Oxford (UK), Redu Transinne (BE), Geel and Mol (Flanders, BE), Toulouse (Sud France), and Barcelona (ES).

If the adaptation of space technologies to non-space applications is feasible, adaptation of defence technologies to civil usages should also be possible.

g. Support to technology and product demonstration (technology showcase)

Public authorities should more than ever invest in physical infrastructure and support measures allowing companies to show that technologies and products are able to meet the client's expec-

32/ ESA — European Space Agency (http://www.esa.int/ESA). The Agency aims at shaping the development of Europe's space capability and ensuring that investment in space continues to deliver benefits to the citizens.

33/ http://www.esa.int/Our_Activities/Technology/Business_Incubation/Mission

tations in a real working environment. This can be done by creating demonstration centres or areas, by providing funding to technology showcase schemes, and by organising dedicated fairs and exhibitions. In the latter case, the French 'Direction générale de l'armement' organised in 2013 the Second Forum of Innovation for its partners (mostly SMEs). An exhibition village focusing around nine technology and science teams with dual-use potential allowed companies to showcase more than 100 innovative projects.

Such support would help companies, especially SMEs, find their first clients and by consequence successfully implement their dual-use strategies.

h. Dual-use clusters

Public authorities can support the creation and initial running costs of a cluster specialised in dual-use technologies. They can also support activities related to dual-use applications. Last but not least, they can support inter-clustering activities either at regional or transnational level.

Those designing public support for dual-use clusters are advised to push cluster managers to take into consideration the Key Enabling Technologies (KETs), including ICT as drivers for their future investment in dual-use technologies, products and services. In Aquitaine (FR), new materials are seen as the driving force of the dual-use strategy, whilst in Bretagne (FR), ICT play this role.

CHAPTER III
EU support to dual-use projects

1. Overview

The Defence Communication of 24 July 2013[34] lays down proposals to enhance the efficiency and competitiveness of the defence and security sector in Europe, to be achieved through initiatives in a wide range of fields including: the single market, industrial policy, R&D+I, dual-use capabilities, space, energy and third markets. On 24 June 2014, the Commission issued a Report[35] on the implementation of this Communication. This Communication and the implementation Report refer to a number of policy and funding tools that can support dual-use projects.

For the current 2014-20 programming period, the main EU policies supporting enterprise competitiveness and innovation are:

- ESIF — European Structural and Investment Funds — which comprise five main funds working together to support economic development across all EU countries, in line with the objectives of the Europe 2020 strategy:
  - European Regional Development Fund (ERDF)
  - European Social Fund (ESF)
  - Cohesion Fund (CF)
  - European Agricultural Fund for Rural Development (EAFRD)
  - European Maritime and Fisheries Fund (EMFF)
- Horizon 2020
- COSME — Competitiveness of Enterprises and small and medium-sized enterprises
- Erasmus+

Moreover, the European Investment Bank (EIB) and its European Investment Fund (EIF) offer companies various types of loans and funding including through its network of financial intermediaries. In general, the EIB is responsible for providing finance and expertise in support of investment projects that further EU policy objectives. The EIF is a specialist tool providing SME risk finance and includes the JEREMIE programme (Joint European Resources for Micro to Medium Enterprises). JEREMIE provides a range of financial instruments to national and regional authorities to support SMEs. These instruments include equity guarantees, microloans, export credit insurance, and venture capital.[36]

34/ COM(2013) 542 final (http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52013DC0542)

35/ COM(2014) 387 final (http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2014:387:FIN

36/ More information is available at: http://www.eib.org/products/jeremie/index.htm

The European Commission has prepared a guide[37] on how to enable synergies to be achieved between the various EU instruments, i.e. ESIF, Horizon 2020 and other research, innovation and competitiveness-related EU programmes. That guide aims to help authorities managing EU funding to ensure coordination, synergies and complementarities between those programmes in order to facilitate their access by all types of stakeholders engaged in R&D+I and competitiveness activities. The guide sets out how the funding operates to ensure these synergies and complementarities are achieved.

These EU instruments do not support projects that are purely military in character, be it research, product or technology development or investment in infrastructure. However, they are available to support dual-use projects, although the business case in support applications must be based on the civil aspects. In the case of infrastructure that can serve both civil and military purposes, only the civil part is eligible for funding.

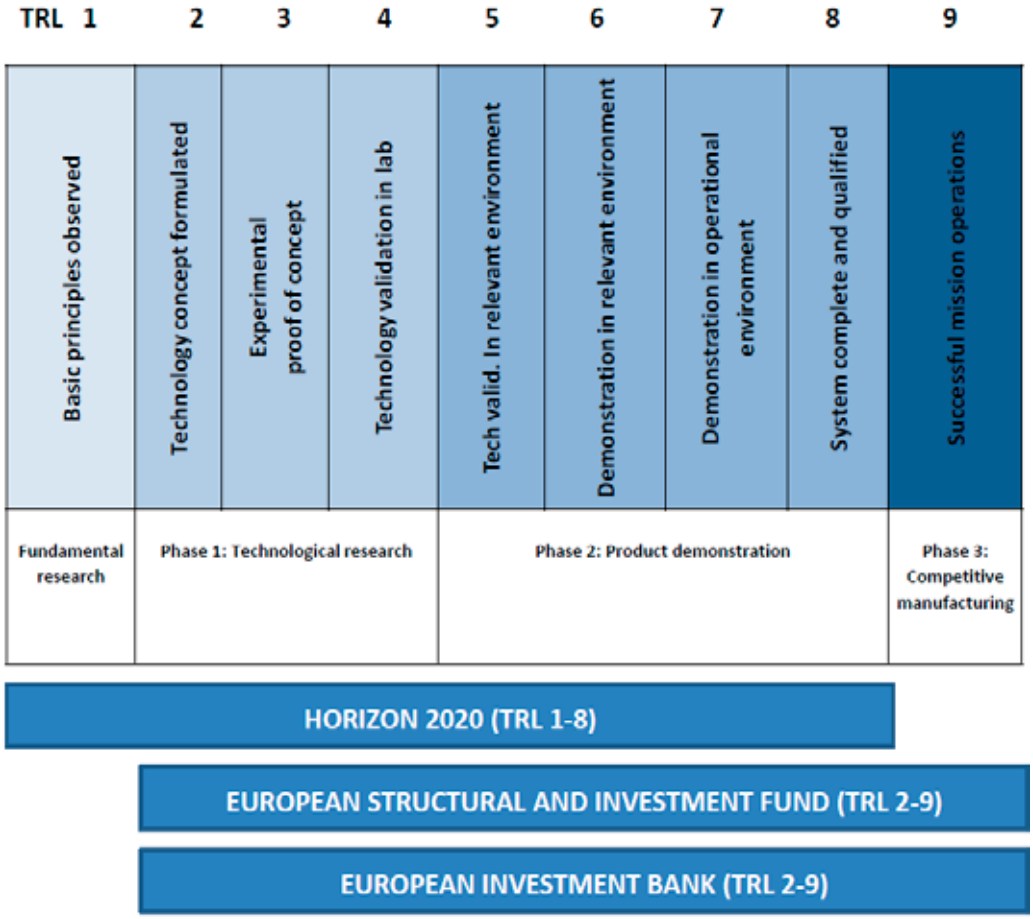
There are many examples of dual-use applications and technologies which could be considered, such as for example advanced autonomous solar power generators, mind-controlled prosthetics, nano-electronics, high autonomy communication devices, big data applications, collision avoidance systems for aircraft, 3D printing, hyper-spectoral sensors, robotics applications, and optical materials and devices which could serve both civil and military purposes.

Here is some guidance on how the tools suggested in Chapter 2 might be funded by EU programmes.

R&D+I	**ERDF, Horizon 2020**
Outsourcing of technology and product range	**ERDF**
Matchmaking events	**ERDF, COSME**
Dual-use incubators	**ERDF**
Specific supports	**ERDF, Horizon 2020, COSME, EIB**
Demonstration centres	**ERDF**
Human capacity building	**ESF, Erasmus+**
Access to funding	**ERDF, Horizon 2020, EIB, EIF**
Pre-commercial procurement and public procurement of innovation	**ERDF, Horizon 2020**
Clusters	**ERDF, COSME, Horizon 2020**

37/ Enabling synergies between European Structural and Investment Funds, Horizon 2020 and other research, innovation and competitiveness-related Union programmes: http://ec.europa.eu/regional_policy/sources/docgener/guides/synergy/synergies_en.pdf

Figure 13 **Dual-use funding through ESIF and Horizon 2020**



In this context, when companies and research organisations apply for EU support for dual-use projects, it is very important to properly highlight the contribution and the value of the project to civil society. They can refer to the technology readiness levels (TRL) cycle to explain the civilian part of their projects for which they are seeking EU funding (see figure 13). In relation to the TRL scale, Horizon 2020 can fund projects up to TRL 8, and ESIF and EIB from TRL 2 up to TRL 9. National or regional authorities can of course design or highlight schemes which provide funding for the defence part of the projects.

Here is an indicative overview of ERDF, Horizon 2020 and COSME funding opportunities to support any dual-use projects by companies or regional strategies.

ERDF

- **R&D+I Infrastructure**
  - Building laboratories
  - Research equipment
  - Technology centres
  - Incubators and science parks
  - Advanced manufacturing capacities
- **Funding R&D+I activities**
  - Research projects
  - Innovative projects
  - Proof of concept
  - Demonstration / prototyping
  - Social innovation
  - Eco-innovation
  - Technological and applied research
  - Early product validation
  - Advanced manufacturing
  - First production
  - KETs and diffusion of general purpose technologies
- **Energy, raw material efficiency and low carbon economy**
- Advisory services
  - Demand stimulation
  - Diffusion of general purpose technologies
  - Networking
  - Clusters and open innovation through smart specialisation
  - Technology transfer
  - Incubation services
  - Use of KETs and ICT
- **Commercialisation of R&D+I**
  - IPR — intellectual property rights
  - Spin-off
  - Co-investment in a Risk Sharing Financial Facility (RSFF) scheme
  - Seed finance
  - Product/Service development
  - Pilot lines and early product validation
- **Networking of key stakeholders**
  - Enterprise-Research-University collaboration
  - Student and PhD outplacement
  - Clusters
  - Open innovation

Horizon 2020

- R&D+I
- Horizontal 'focus'
  - ERC — European Research Council
  - Collaborative projects
  - ERA-NET
  - Joint initiatives
  - Future and emerging techno-logies
- Sectoral 'focus'
  - KET — Key Enabling Technolo-gies
  - Nanotechnologies
  - Advanced materials
  - Biotechnologies
  - Space
  - Security
  - ICT
- Research infrastructures
- Societal challenges
  - Secure, clean and efficient energy
  - Smart, green and integrated transport
  - Secure societies — Protecting freedom and security of Europe and its citizens
- Enterprise competitiveness
  - Dedicated SME instrument
  - SME integrated participation
  - Fast track to innovation
  - Risk Sharing Financial Facility (RSFF)
  - Pre-commercial procurement

COSME

- Financial engineering
- Clusters

2. European Regional Development Fund (ERDF)

a. Legal conditions

Defence companies are eligible for EU structural funds. However, the funds are only available for projects with civil objectives and in line with the priorities of the particular fund. Despite this limitation, these funds should be of interest to defence companies, as many of them have significant civil business interests, and this trend is increasing. The key issue to remember is that the investment co-financed by the structural funds must contribute to achieving civil objectives set out for ESIF and linked to the Europe 2020 strategy. In practice, this means that applications for funding must be based on a strong civil business case even if there are clear dual-use benefits identified from the start. The application will only be assessed on the merits of the civil case. Moreover, in the specific case of infrastructure, if the project is supposed to benefit both military and civilian operators, the ESIF assistance can be provided only with a view to assisting the attainment of the civilian objectives. Any additional financial costs created by the military participation in or use of the infrastructure are not eligible for funding.

The ERDF cannot support equipment, buildings or infrastructures but can be used for the civilian part of a dual-use project.

b. ERDF and dual-use projects

The European Regional Development Fund (ERDF)[38] invests in horizontal measures aiming at enhancing the competitiveness and innovation capabilities of regional businesses. It also provides support to intermediary organisations and research organisations in order to provide support services to SMEs. This is reflected by the following three investment priorities (out of 11):

Priority 1: Strengthening R&D+I
Priority 2: Enhancing access to, and use and quality of, ICT
Priority 3: Enhancing the competitiveness of SMEs.

To ensure an optimal use of ERDF funding, regions and Member States had to establish some policy framework conditions. The most important one is the 'smart specialisation strategy'. This sets priorities in order to build a competitive advantage by developing and matching research and innovation own strengths to business needs. This will address emerging opportunities and market developments in a coherent manner, while avoiding duplication and fragmentation of efforts. A smart specialisation strategy may take the form of, or be included in, a national or regional research and innovation (R&I) strategic policy framework. It has to be developed and implemented with clear involvement of, and collaboration among, entrepreneurs, researchers, civil society and government.

ERDF support includes the following activities:

(a) productive investment, which contributes to creating and safeguarding sustainable jobs through direct aid for investment in SMEs;

(b) productive investment, irrespective of the size of the enterprise concerned, which contributes to the following investment priorities:
- strengthening research, technological development and innovation;
- supporting the shift towards a low-carbon economy in all sectors; and,
- where that investment involves cooperation between large companies and SMEs, to enhancing access to, and use and quality of, ICT.

38/ Regulation (EU) No 1301/2013 on the European Regional Development Fund and on specific provisions concerning the Investment for growth and jobs goal — OJ L347, 20.12.2013.

ERDF also supports interregional cooperation under Article 70 of the common provisions of the ESIF regulation[39] and through cross-border, transnational and interregional cooperation programmes.

Examples of funded projects

In February 2014, a pilot project began in Portugal under the name of 'TURTLE' (Project holder: Silva Matos Metalomecanica S.A., INESC PORTO, ISEP, CINAV). It became the first project to receive co-funding for dual-use development. The co-funding is worth € 770 000, i.e. 60 % of the total project cost, and supports the development of a robotic vehicle for underwater operations that can be used for both civil and defence applications. TURTLE was a project supported by the European Defence Agency (EDA). The EDA effectively helps defence actors of all Member States to benefit from wider EU policies and supporting tools, such as ESIF, by raising awareness, disseminating good practices, and providing support on pilot dual-use research projects to access ESIF, thus promoting innovation across the European Defence Technological and Industrial Base. In this respect, EDA cooperates with the European Commission and Member States to identify and support eligible projects for ESIF funding. During 2007-13, Member States submitted 72 project proposals to EDA, of which 44 received free guidance from EDA and 7 were selected as pilot projects to be supported in the development of a funding application. The pilot projects were located in Bulgaria, Poland, Germany, Portugal, France, United Kingdom and Spain. EDA will continue supporting dual-use projects in the new programming period in a similar manner.

CenSec, a cluster initiative in Denmark in the field of defence and security, helps SMEs develop joint projects to address defence and dual-use markets (www.censec.dk) and advises on accessing funds from the ERDF and ESF.

The KONVER Community Initiative (funded by the ERDF) aimed at assisting regions affected by the decline of defence industries and installations due to the fall of the Berlin Wall. Regions have also used ERDF co-funding to implement schemes having as objectives, for instance, to encourage the arms industry to convert to civilian activities through:

- ➔ *improving know-how within companies;*
- ➔ *supporting the grouping of companies;*
- ➔ *adapting quality systems;*
- ➔ *enhancing research and technology deployment; and*
- ➔ **professional training.**

39/ Regulation (EU) No 1303/2013 laying down common provisions on the European Regional Development Fund, the European Social Fund, the Cohesion Fund, the European Agricultural Fund for Rural Development and the European Maritime and Fisheries Fund and laying down general provisions on the European Regional Development Fund, the European Social Fund, the Cohesion Fund and the European Maritime and Fisheries Fund and repealing Council Regulation (EC) No 1083/2006 — OJ L347, 20.12.2013.

c. Tips to access ERDF funding

1. For companies

Companies and research organisations need to contact the regional managing authorities, or the regional intermediary organisations providing support services to companies, in order to get familiar with the ERDF implementation system in their countries or regions. The list of managing authorities can be found at http://ec.europa.eu/regional_policy/manage/authority/authority_en.cfm.

Companies can also consult a handbook on European Structural and Investment Funds[40] published by the EDA. It outlines the step-by-step process to be followed by defence actors in order to access European Structural and Investment Funds for dual-use projects.

2. For regional authorities

Regional authorities should allow dual-use companies and research organisations to benefit from the policy mix designed to implement their operational programme and their Research and Innovation Strategies for Smart Specialisation (RIS3). Regional authorities can also use the opportunities offered by the Interregional cooperation programme INTERREG to share or exchange experiences in the field of public support to implement a dual-use strategy.

The development of good cooperation between national and regional authorities responsible for coordinating or managing ESIF and the ministries of defence would facilitate identification of dual-use projects that respond to the regional priorities as described in the local operational programmes.

3. European Social Fund (ESF)

The future success of Europe's defence sector depends on retaining personnel with key skills and recruiting those with the skills needed for the future. Some areas of the defence sector are already experiencing skills shortages, which are expected to get worse as a result of staff retirements and the difficulties of attracting newly qualified professionals into the sector. The skills required in the defence sector are not necessarily industry specific, as most of them are similar to those required in other industrial sectors. Most defence-related companies are also involved in civilian activities and this will increase in the foreseeable future. This means that the majority of staff will work in both civil and defence technologies and products throughout their careers. This may provide some scope for the use of EU funding instruments conceived for civil activities.

a. Legal conditions

The ESF regulation does not mention specific interventions in the defence sector. As for the ERDF, the ESF cannot support the defence sector directly, but only the civilian part of a dual-use project in line with the ESF Regulation and national programming documents. The supported projects must contribute to the objectives of the ESF.

According to Article 2 of the Regulation[41], the ESF: promotes high levels of employment and job

40/ http://www.eda.europa.eu/info-hub/publications/publication-details/pub/european-structural-funds.

41/ Regulation (EU) No 1304/2013 on the European Social Fund — OJ L347, 20.12.2013.

quality; improves access to the labour market; supports geographical and occupational mobility of workers and facilitates their adaptation to

industrial change and to changes in production systems needed for sustainable developments; encourages a high level of education and training for all and supports the transition between education and employment for young people; combats poverty, enhances social inclusion, and promotes gender equality, non-discrimination and equal opportunities. In so doing, it contributes to EU priorities as regards strengthening economic, social and territorial cohesion.

The ESF supports Member States in pursuing the priorities and headline targets of the Europe 2020 strategy for smart, sustainable and inclusive growth and by allowing Member States to address their specific challenges with regard to achieving the Europe 2020 strategy objectives. The ESF provides support to workers, companies, including actors in the social economy, and entrepreneurs, as well as to systems and structures with a view to facilitating their adaptation to new challenges including reducing skill mismatches and promoting good governance, social progress and the implementation of reforms, in particular in the fields of employment, education, training and social policies.

b. ESF and dual-use strategy

The ESF could support projects aiming at providing training to workers who need to adapt to a new situation in the labour market. The scope of supported actions has to be in line with the funding priorities identified for each Member State in the Partnership Agreements and Operational Programmes and in the subsequent Country-Specific Recommendations resulting from the European Semester exercise.

In that framework, ESF-funded actions can include the re-skilling of redundant workers who need to be reintegrated into the labour market. Also, the ESF can support enhancing productivity and quality of employment through, for instance, projects related to education and training (re-skilling and up-skilling of professional qualifications). For example, the ESF can give employees new productive skills and opportunities, often for new growing sectors such as those forming part of the low-carbon economy. As such, the ESF can support training of employees to acquire new skills, for example in the area of KETs, ICT or green skills.

The main focus of the ESF is about people: the fund supports jobs and social inclusion, helping people get better jobs and ensuring fairer job opportunities for all.

Examples of funded projects

Education for National Security System (University of Defence, Brno, CZ) — The project aims at the innovation of current education and training systems for experts in the national security system through an pioneering degree programme of economics and management.

Forensic Computing (Cranfield University, Faculty of Defence and Security, UK) — A postgraduate course for UK armed forces personnel and Ministry of Defence civil servants.

c. Tips to access ESF funding

ESF funding is available through the Member States and regions. To find out about the eligibility for ESF support in your country, please contact the responsible ESF managing authority: http://ec.europa.eu/esf/main.jsp?catId=524&langId=en

4. Horizon 2020

a. Legal conditions

Horizon 2020[42] is the EU's research programme that aims at scientific breakthroughs, discoveries and first-class research by taking the best ideas from the laboratory to the market. With a budget of € 80 billion, it is a means to drive economic growth and create jobs. Even if the programme has a strong economic focus, substantial parts of the research funded is of relevance for defence and can lead to technologies that will be used by defence actors. It is important to note the limits of Horizon 2020 funding in its Article 19, point 2 on ethical principles, that 'research and innovation activities carried out under Horizon 2020 shall have an exclusive focus on civil applications'.

Whereas research and innovation activities will have an exclusive focus on civil applications, the Commission is working with the European Defence Agency (EDA) in order to find synergies between Horizon 2020 and the Agency's research activities.

b. Horizon 2020 and dual-use projects

Horizon 2020 offers many opportunities to fund the civil part of dual-use projects either through its technology component or through its contribution in response to societal challenges. Horizon 2020 provides specific support to SMEs and access to finance. Horizon 2020 operates through calls for proposals and joint programming initiatives.

Below is a snapshot of the Horizon 2020 strands[43] that provide the most promising funding opportunities for the development of dual-use technologies, products and services, or for defence stakeholders to develop civilian applications of their knowledge.

Secure societies — protecting freedom and security of Europe and its citizens

Broad lines of the activities:

a) fight crime, illegal trafficking and terrorism, including understanding and tackling terrorist ideas and beliefs;

b) protect and improve the resilience of critical infrastructures, supply chains and transport modes;

42/ Cf. the guide 'HORIZON 2020 in brief. The EU Framework Programme for Research & Innovation ' http://ec.europa.eu/programmes/horizon2020/en/news/horizon-2020-brief-eu-framework-programme-research-innovation.

43/ Regulation (EU) No 1291/2013 establishing Horizon 2020 — the Framework Programme for Research and Innovation (2014-2020) — OJ L 347, 20.12.2013. See http://ec.europa.eu/programmes/horizon2020

(c) strengthen security through border management;
(d) improve cyber security;
(e) increase Europe's resilience to crises and disasters;
(f) ensure privacy and freedom, including in the internet, and enhance the societal legal and ethical understanding of all areas of security, risk and management;
(g) enhance standardisation and interoperability of systems, including for emergency purposes;
(h) support the Union's external security policies, including conflict prevention and peace-building.

Future and emerging technologies (FET)

The specific objective is to foster radically new technologies with the potential to open new fields for scientific knowledge and technologies and contribute to the European next generation industries, by exploring novel and high-risk ideas building on scientific foundations (...).

FET shall foster efforts to pursue small-scale research opportunities across all areas, including emerging themes and grand scientific and technological challenges that require close collaboration between programmes across Europe and beyond. This approach shall be driven by excellence and extends to exploring pre-competitive ideas for shaping the future of technology, enabling society and industry to benefit from multidisciplinary research collaboration that needs to be engaged at European level by making the link between research driven by science and research driven by societal goals and challenges or by industrial competitiveness.

Leadership in enabling and industrial technologies

1. Information and Communication Technologies (ICT)

Broad lines of the activities:
a) A new generation of components and systems: engineering of advanced, embedded and energy and resource-efficient components and systems;
b) Next generation computing: advanced and secure computing systems and technologies;
c) Future internet: software, hardware, infrastructures, technologies and services;
d) Content technologies and information management;
e) Advanced interfaces and robots: robotics and smart spaces;
f) Micro and nano-electronics and photonics: key enabling technologies related to micro and nano-electronics and to photonics covering also quantum technologies.

2. Nanotechnologies

Broad lines of the activities

a) Developing next generation nanomaterials, nano-devices and nano-systems
Aiming at fundamentally new products enabling sustainable solutions in a wide range of sectors.

b) Ensuring the safe and sustainable development and application of nanotechnologies
Advancing scientific knowledge of the potential impact of nanotechnologies and nano-systems on health or on the environment, and providing tools for risk assessment and management along the entire life cycle, including standardisation issues.

c) Developing the societal dimension of nanotechnology
Focusing on governance of nanotechnology for societal and environmental benefit.

3. Advanced materials

Broad lines of the activities

a) Cross-cutting and enabling materials technologies
b) Materials development and transformation
c) Management of materials components
d) Materials for a sustainable, resource-efficient and low emission industry

4. Biotechnology

Broad lines of the activities

a) Boosting cutting-edge biotechnologies as a future innovation driver
b) Biotechnology-based industrial products and processes
c) Innovative and competitive platform technologies

5. Advanced manufacturing and processing

Broad lines of the activities

a) Technologies for Factories of the Future
b) Technologies enabling energy-efficient systems

6. Space

Broad lines of the activities

a) Enabling European competitiveness, non-dependence and innovation of the European space sector

b) Enabling advances in space technologies
c) Enabling exploitation of space data

Secure, clean and efficient energy
Broad lines of the activities
a) Reducing energy consumption and carbon footprint by smart and sustainable use
c) Alternative fuels and mobile energy sources
g) Market uptake of energy innovation — building on Intelligent Energy Europe

Smart, green and integrated transport

Broad lines of the activities
a) Resource-efficient transport that respects the environment

Climate action, environment, resource efficiency and raw materials

Broad lines of the activities
a) Fighting and adapting to climate change
b) Protecting the environment, sustainably managing natural resources, water, biodiversity and ecosystems
c) Enabling the transition towards a green economy and society through eco-innovation

Innovation in SMEs

Broad lines of the activities
a) Support for research-intensive SMEs
b) Enhancing the innovation capacity of SMEs
c) Supporting market-driven innovation

Marie Skłodowska-Curie Actions

The broad line of activities is nurturing excellence by means of cross-border and cross-sector mobility.

Key activities shall be to encourage experienced researchers to broaden or deepen their skills by means of mobility by opening attractive career opportunities in universities, research institutions, research infrastructures, businesses, SMEs and other socio-economic groups all over Europe and beyond. This should enhance the innovativeness of the private sector and promote cross-sector mobility.

On top of those research areas, Horizon 2020 offers funding schemes such as:

Risk Sharing Facilities

Broad lines of the activities
a) The Debt facility providing debt finance for R&I: 'Union loan and guarantee service for research and innovation'
b) The Equity facility providing equity finance for R&I: 'Union equity instruments for research and innovation'

Pre-commercial procurement and public procurement of innovative solutions

Union funding may take the form of pre-commercial procurement or the procurement of in-

novative solutions carried out by the Commission or the relevant funding body on its own behalf or jointly with contracting authorities from Member States and associated countries.

The procurement procedures may authorise the award of multiple contracts within the same procedure (multiple sourcing).

Inducement Prizes

The European Commission will define challenges to provide an award to the first individual or team who delivered a breakthrough solution. Compared with traditional funding tools, such a prize reduces entry barriers and helps mobilise new talents. Moreover, the winner does not have to justify eligible expenditure.

Examples of funded projects

Icarus — Unmanned Search and Rescue. Involving 23 partners, amongst them Ecole Royale Militaire (BE) and Nato Undersea Research Center (IT). The project aims at using unmanned aerial systems and ground vehicle tools for search and rescue of civilians. The technologies developed will be used for detecting, locating and rescuing citizens. [FP7 Security. EU contribution: € 12.6 million].

Darius — Deployable SAR (Search and Rescue) Integrated chain with Unmanned System — is a project looking at how unmanned systems developed through military programmes can be deployed for civil use to enhance first responder capabilities and intervene in hazardous areas. The project is led by BAE Systems (UK). [FP7 Security. EU contribution: € 7.5 million].

Sectronic — Security System for Maritime Infrastructures, Ports and Coastal Zones — is a project aiming at observing and protecting critical marine infrastructures involving all observation means (offshore, onshore, air, space). Amongst the partners: Norwegian Defence Research Establishment. [FP7 Security. EU contribution: € 4.4 million].

Firerob — Autonomous firefighting robotic vehicle — is a project which aims at developing a prototype of autonomous unmanned firefighting vehicles able to efficiently fight against fire in hazardous environments. [FP7 SME. EU contribution: €0.8 million].

Sunny — Smart Unmanned aerial vehicle sensor Network for detection of border crossing and illegal entry — is a project whose objective is the design and realisation of a platform to gather data and information from distributed sensors active 24/7 in any weather conditions in order to patrol frontiers and intercept intrusions. [FP7 Security. EU contribution: € 9.6 million].

Sniffer — Capture and analysis of odours. It offers significant potential for border security applications related to the detection and analysis of persons, illegal substances and in particular explosives. [FP7 Security. EU contribution: € 3.5 million].

Smart@Fire: this is a pre-commercial procurement project aiming at developing integrated ICT solutions for smart personal protective equipment for firefighters and first responders that are transferrable in a global market. [FP7 ICT. EU contribution: € 1.5 million].

Some defence research organisations have taken part in FP7 projects. This is the case of the Swedish Defence Research Agency (projects Lotus [FP7 Security), Encounter [FP7 Security]), the Norwegian Defence Research Establishment (Sectronic), the Ecole Militaire Belge (DOTNAC [FP7 Transport], TIRAMISU [FP7 Security]) or the Direction générale de l'armement (FR) (Wezard, HAIC, OPENAIR [all FP7 Transport]).

Example of a project with funding from different EU sources

The "Electronic Components and Systems for European Leadership" (ECSEL) Joint Undertaking is implementing Horizon 2020 in the area of micro & nano-electronics, embedded software and system integration. Its goals include maintaining state of the art semiconductor and smart systems manufacturing capability in Europe, fostering the development of ecosystems involving innovative SMEs, strengthening and creating clusters in promising areas. By its very nature ECSEL will cover also many dual use technologies.
The ECSEL members are the EU, Member States and Associated countries to the Horizon 2020 as well as industry associations.
The estimated eligible costs of the projects to be supported in the ECSEL programme amount to more than €5 billion, with €1.17 billion from EU grants and at least the same amount from the ECSEL Participating States. In addition, ECSEL pioneers a mechanism combining funding from both Horizon 2020 and the European Structural and Investment Funds when the regions have a smart specialisation strategy coherent with the ECSEL research and innovation areas.

c. Tips to access Horizon 2020 funding

1. For companies

Analyse the annual work programme and assess the eligibility of the proposed project. For the programming period 2014-20, have a look at http://tinyurl.com/m246ybu.
Get in contact with the national contact point (NCP). The list can be found at http://ec.europa.eu/research/participants/portal/desktop/en/support/national_contact_points.html and with your European professional trade organisation and peers. If needed, get support from specialised consultancy services to draft proposals.
Proposers should limit themselves to basic technologies that could then be adapted to defence applications. Proposals which comprise clear defence aspects will not be funded.
Do remember that FP7 aimed at financing only the very best projects, and the same will apply for Horizon 2020. The average success rate of proposals for FP7 was 19 %.

2. For regional authorities

Regional authorities can put in place some support schemes to help stakeholders to enhance their participation in Horizon 2020 calls. Below is a record of the actions implemented in this field.

- ➔ Signposting pre-information regarding future potential calls
- ➔ Awareness raising, information and advice to access FP7 / Horizon 2020
- ➔ Creation of sectorial or cross-sectorial interest groups
- ➔ Promotion of local academia-industry cooperation and their cross-border networking

- ➔ Advice and quick check of project ideas
- ➔ Support to international partner search
- ➔ Grants for exploring project feasibility and validation of project ideas
- ➔ Grants to seek advice from specialised consultants
- ➔ Provision of training to potential EU project managers
- ➔ Support to ERA-NET projects on strategic topics. These projects are excellent springboards for regional actors' participation in FP7 / Horizon 2020
- ➔ Provision of mentoring and coaching to potential EU project partners
- ➔ Support to attend or get feedback from info days on calls for tender.

Regional authorities can 'sponsor' info days on EU calls for tender which have a potential to support dual-use technologies in partnership with their national contact point. They should also 'lobby' for a dual-use joint programming initiative (ERA-NET).

5. EU programme for the Competitiveness of Enterprises and SMEs (COSME)

a. Legal conditions

Although **COSME**[44] has no specific restrictions relating to defence, in practice, the sector (including for dual-use products) may face difficulties when accessing the COSME financial instruments (loan guarantees or venture capital) due to policy restrictions applied by the **EIB group** which, through the EIF, operates these instruments. Such restrictions do refer to *the production of and trade in weapons and ammunition and inter alia, to related research, development or technical applications.* The exact expression of these restrictions will be laid out in the calls for expression of interest of potential financial intermediaries, expected later in 2014.

As far as the EIB is concerned, it applies the following policy lines: 'Support to SMEs from defence and security sector: in principle, production of weapons and ammunition, arms, military or police equipment or infrastructures are part of the excluded sector list for the EIB. Thus, projects in this domain cannot be financed by the Bank. Regarding financing of SMEs under global loans, SMEs whose main activity exclusively refers to those excluded sectors are not eligible for EIB financing. SMEs whose activity only in part fall into defence sectors and that in addition to serving the defence market also develop and produce civilian products and technologies may be eligible for EIB financing on a case by case basis.'

44/ Regulation (EU) No 1287/2013 establishing a Programme for the Competitiveness of Enterprises and small and medium-sized enterprises (COSME) (2014 – 2020) — OJ L347, 20.12.2013. See http://ec.europa.eu/enterprise/initiatives/cosme/index_en.htm

b. COSME and dual-use projects

The COSME programme contributes to the following general objectives:

a) strengthening the competitiveness and sustainability of the Union's businesses, particularly SMEs;
b) encouraging entrepreneurial culture and promoting the creation and growth of SMEs.

The specific objectives of the programme are:

(a) to improve access to finance for SMEs in the form of equity and debt;
(b) to improve access to markets, particularly inside the Union but also at global level.

Within the framework of COSME, the Commission supports the Enterprise Europe Network,[45] which provides integrated business support services to help European SMEs undertake cross-border business in the single market and in third countries. Services provided by the Enterprise Europe Network may include the following:

a) provision of advice and information (for example on EU legislation, standards, EU funding, other sources of finance, EU R&D programmes and innovation); and
b) facilitation of cross-border business cooperation, R&D, technology and knowledge transfer and technology and innovation partnerships.

The Enterprise Europe Network's advisory and partnership services are targeted at SMEs in all sectors and many of these services are relevant to SMEs in dual-use sectors. For example, the network's partnership services can help stimulate cross-sector fertilisation between civil and defence industrial sectors for dual-use activities. The Network also has 17 sector groups, including a number in areas relevant to dual use such as aerospace and nanotechnologies. These groups

focus on sectorial and cross-sectorial business-to-business (B2B) partnership activities.

Finally, through COSME, the Commission supports actions intended to develop new competitiveness and business development strategies. Such actions may include the sharing of good practices on framework conditions and on the management of world-class clusters and business networks, the promotion of transnational collaboration among clusters and business networks, the development of sustainable products, services, technologies and processes, as well as resource and energy efficiency and corporate social responsibility.

c. Tips to access COSME funding

1. For companies

Take contact with the COSME intermediaries:

- Financing schemes: http://ec.europa.eu/enterprise/policies/finance/cip-financial-instruments/index_en.htm
- EEN contact points are to be found on http://een.ec.europa.eu/about/branches
  The calendar of EEN transnational events is to be found on http://een.ec.europa.eu/tools/services/EVE/Event/ListEvents

45/ See http://een.ec.europa.eu.

- Clusters: seek information about calls regarding transnational cooperation between clusters and keep contact with the European Cluster Alliance
  http://www.eca-tactics.eu/eca/news-and-events

Companies should follow the work of the EEN Aeronautics and Space sectorial group, which organises several B2B matchmaking events. Some of them deal with dual-use opportunities. They should also use the EEN Technology Profiles Data Base to promote their innovations. They can also ask their EEN member to take an initiative to develop transnational or cross-sectorial activities related to dual-use technologies.

2. For regional authorities

Collaborate with the COSME intermediary organisations mentioned in point 3.5.3.1 above.

6. Erasmus+

a. Legal conditions

Erasmus+ has no sectorial limitations.

b. Erasmus+ and dual-use projects

One of the objectives of the Erasmus+ programme[46] is education and training through mobility of individuals. Another objective is cooperation for innovation and the exchange of good practices. Erasmus+ supports partnerships between the world of work and education and training institutions in the form of:

- knowledge alliances between, in particular, higher education institutions and the world of work aimed at promoting creativity, innovation, work-based learning and entrepreneurship by offering relevant learning opportunities, including developing new curricula and pedagogical approaches;
- sector skills alliances between education and training providers and the world of work aimed at promoting employability, contributing to the creation of new sector-specific or cross-sectorial curricula, developing innovative methods of vocational teaching and training, and putting the Union transparency and recognition tools into practice.

Example of funded projects

The Defence and Security Faculty of Cranfield University (UK), the University of Defence in Brno (CZ) and l'Ecole Royale Militaire (B) were all partners of the Erasmus Mobility Programme.

c. Tips to access Erasmus+ funding

1. For companies

Assess the potential and benefit of cooperation with universities to develop ad hoc education or training dual-use technology curricula.

2. For regional authorities

Support transnational relationships between universities and dual-use companies to develop a knowledge alliance in this sector.

46/ Regulation (EU) No 1288/2013 establishing 'Erasmus+': the Union programme for education, training, youth and sport — OJ L347, 20.12.2013. See http://ec.europa.eu/programmes/erasmus-plus/index_en.htm

Recommendations

Dual-use markets are growing and thus provide new opportunities for companies, research organisations and public authorities to invest in the design of a strategy to harvest the fruit of this growth.

Public authorities at national and regional level should design dual-use strategies and implement programmes aiming at helping companies engage in such diversification, which requires a technology component and an internationalisation outreach. Amongst the tools to be used, public authorities should pay a greater attention to market intelligence, inter-clustering and international activities, networking, pre-commercial procurement and support to the integration of key enabling technologies and information and communication technologies in the product range of SMEs.

The managing authorities of European Structural and Investment Funds should consider dual-use projects as part of emerging sectors for the update of the Research and Innovation Strategies for Smart Specialisation of the various regions.

Ministries of defence should assess the full potential of dual-use technologies and products and review the way SMEs can better access their purchases and can be involved in the supply chain. Cluster organisations should present an inter-clustering pilot project in the field of defence and dual-use industries.

Companies should take into consideration the wide variety of EU support instruments helping them undertake R&D+I activities, enhance their competitiveness and access the internal market.

Potential work programme for a network of regions interested in dual-use industry — building blocks

Regional authorities, in partnership with intermediary organisations supporting SMEs (regional development and innovation agencies, cluster organisations, ...) should consider joining forces in order:

- to develop an INTERREG project aiming at benchmarking and designing regional strategies in the field of dual use. The lessons learnt from EDA experience should be a good starting point;
- to help their cluster organisations reply to a COSME call for tender regarding the internationalisation of clusters;
- to set up and manage an ERA-NET in the field of dual-use technologies and sectorial groups within the EEN network;
- to consider the organisation of a meet-the-buyer matchmaking event, possibly in cooperation with the European Defence Agency (EDA);
- to cooperate to develop a pipeline of dual-use project ideas within the framework of Horizon 2020;
- to organise an annual event — 'Dual-Use Intelligence' — around key technologies in support of dual-use markets. This event would be organised with the involvement of industrial sector associations;
- to brainstorm to identify dual-use research challenges that might be eligible for Horizon 2020 inducement prizes;
- to map European dual-use industry clusters of excellence on the basis of a set of meaningful indicators related to R&D, innovation and production activities as well as cross-sectorial networking and internationalisation capacities;
- to define common arguments to launch an advocacy campaign targeting national ministries of defence to take full advantage of civil technologies and products and to allow the free use of defence knowledge for civil applications.

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