



Study on the Contribution of the defence sector to Regional Development through the European Structural and Investment Funds- EASME/2019/OP/0015

Final Report

Madrid, Sofia, Brussels, 6th May 2021



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List of acronyms

CAP	Common Agricultural Policy
CF	Cohesion Fund
DG	Directorate-General
DG GROW	Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs
DG HOME	Directorate-General for Migration and Home Affairs
DG MARE	Directorate-General for Maritime Affairs and Fisheries
DG REGIO	Directorate-General for Regional and Urban Policy
EAFRD	European Agricultural Fund for Rural Development
EASME	Executive Agency for Small and Medium-sized Enterprises
EC	European Commission
EIB	European Investment Bank
EP	European Parliament
ENDR	European Network of Defence Related Regions
ERDF	European Regional Development Fund
ESF	European Social Fund
ESIF	European Structural Investment Funds
ETC	European Territorial Cooperation
GDPR	General Data Protection Regulation
ICT	Information and Communications Technology
KoM	Kick-off Meeting
MA	Managing Authority
OECD	Organisation for Economic Co-operation and Development
QMS	Quality Management System
R&D	Research & Development
RQ	Research question
SMEs	Small and Medium Enterprises
ToR	Terms of Reference

Abstract

This report presents the results of the Study on the Contribution of the defence sector to Regional Development through the European Structural and Investment Funds- EASME/2019/OP/0015. **The objective is the Study is to** provide an overview of how and to what extent defence related and dual use activities funded by European Structural and Investment Funds (ESIF) have been integrated in and contributed towards the framework of the EU's cohesion policy for the programming period 2014-2020 as well as determining the potential for the forthcoming 2021-2027 programming period.

The main outcomes arising from this Study are the following: (1) it addresses the information gap on dual use and defence related projects co-financed by the ESIF was addressed through the mapping of 972 supported projects; (2) evidence was collected on the range of contributions made by these defence related and dual use projects in support to the main priorities of the Cohesion Policy mainly through ERDF (Thematic Objectives 1.- innovation- and 3- competitiveness-) and ESF (Thematic Objective 10- skills development); (3) conclusions are drawn from the collected evidence and guidance is developed for defence related stakeholders regarding upcoming opportunities.

Executive Summary

This study was commissioned by the Executive Agency for Small and Medium-Sized Enterprises (hereinafter EASME) to Ecorys on the 3rd February of 2020 to undertake the Study on the Contribution of the defence sector to Regional Development through the European Structural and Investment Funds (ESIF). ESIF may be used by Member States in the defence sector as long as they contribute to the objectives of the fund in question to (i) co-fund productive investment projects, and (ii) support the modernisation of the defence supply chains. Defence industries can contribute to the goals and the objectives set in the ESIF, such as promoting the development of regional economics, representing a high investment multiplier on skills, jobs, technological and economic development.

The **general objective** of the study is to provide an overview of how and to what extent defence related and dual use activities funded by European Structural and Investment Funds have been integrated in and contributed towards the framework of the EU's cohesion policy for the programming period 2014-2020, as well as determining the potential for the forthcoming 2021-2027 programming period. **The geographical scope** of the study is all 27 EU Member States as well as the United Kingdom, who formally left the EU shortly before the start of this study. Nevertheless, the UK is included in this study as it was fully involved in the implementation of ESIF in the MFF 2014-2020. In order to do so, the study was carried out in three parts:

The **first part** consisted of mapping and compiling all projects linked to dual use and defence related activities implemented at transnational, national or regional/local level co-financed by the ESIF during the period 2014-2020. The first goal was to create an operating definition for defence and dual use projects:

A project was labelled as defence related if a partner/beneficiary involved is identified as a defence related stakeholder and/or if the project originated with a potential defence related application. Additionally, projects for which the funding has not been specifically used with a clear defence/dual use application but do contribute towards the modernisation and increased competitiveness of the defence sector were also included under this category.¹ Projects for which a defence related application was not foreseen initially but outputs/ approach/ technology used could be adapted for a defence related application, have been defined as dual use. The Study then goes on to map and harmonise information on all projects linked to dual use and defence related activities which benefited from ESIF during the 2014-2020 programming period.

The **second part** involved the elaboration of 20 good practice case studies, and an overview of the current and future ESIF Regulation Package and the link to regional and national smart specialisation strategies.

Finally, the **third part** included the consolidation of the research carried out, the production of an information brochure and conducting a workshop. The main findings and conclusions that are extracted from carrying out this Study are the following:

1. **The defence sector has made a significant contribution to regional development over the past programming period through ESIF.** Specifically, the European Structural and Investment Funds have supported 972 defence related and dual use projects during the 2014-2020 programming period. The funded projects identified in this study cover a broad range of activities, including technology,

¹ In practice, the vast majority of projects identified as defence-related were identified as such because they had a defence stakeholder involved, rather than because they originated with a potential defence application.

facilities, infrastructure, training, internationalisation and exports, involving a range of players in the supply chain from major multinational firms to micro-SMEs. The 1.01 billion euros investment from ESIF leveraged an additional 860 million euros from other sources (including defence industry investment). The activities mapped during this study align closely with the policy objectives of the previous and forthcoming ESIF programming period, indicating that the defence sector can play a significant role in enabling the delivery of these policy objectives through accessing ESIF funding.

2. **Both the European Regional Development Fund (ERDF) and the European Social Fund (ESF) have played a role in supporting projects.** The largest share of ESIF funding support comes from the European Regional Development Fund, which has devoted 814 million euros for co-financing dual use and defence related projects. The European Social Fund has also played a role and has invested 118 million euros to support skills development and employment opportunities in the sector. Finally, European Territorial Cooperation Programmes (INTERREG) has further allocated 33 million euros in cross border and transnational cooperation projects.
3. Irrespectively of the fact that the inventory of projects identified offers a wide variety of activities and types of projects, looking in detail at the features and characteristics of the 972 ESIF supported projects, **the most common project would be one which is funded by the European Regional Development Fund, has a company (including both SMEs and larger type of companies) as a lead beneficiary, a strong focus on innovation, research and technological development, has a budget of around 100k euro and can be considered a “dual use” project.**
4. **The diverse span of dual use activities funded – and the number of stakeholders involved – reinforces the scope for added value from dual use technologies.** Almost 50% of the projects funded (470) were classified as contributing to innovation, research and technological development, covering a diverse range of technology areas from advanced materials to quantum computing. The funding of such technologies through ESIF can have a multiplier effect through a number of factors including: increasing the market size (defence and civil customer base), creating greater supply-side efficiencies (through leveraging R&D investment in different applications) and stimulating innovation (through increased diversity of thought).
5. **Dual use projects represent the majority (58%) of projects supported but followed closely by 42% of the identified projects being considered defence related.** On average, dual use projects tend to be more closely related to innovation, research and technological developments (such as new technological developments, drones, new laser cutting technologies) than defence related projects. They also have more to do with knowledge and technology transfer. Defence related projects put more focus on business support and employment. Defence stakeholders involved in defence related projects are to a large extent defence companies, both small and large in size.
6. **The case studies emphasise the complementary competences that defence stakeholders and civil stakeholders often bring to a collaboration.** Many of the identified consortia for defence related projects have both defence stakeholders and non-traditional defence actors from private sector and academic sector. The case studies provide some qualitative evidence that in these examples, the complementary competences leveraged through the consortium means that the whole is greater than the sum of its parts. The regional focus of ESIF is helpful in this regard in terms of fostering new relationships and generating productive clusters.

7. **The macro analysis of the projects identified – and exemplified by the 20 case studies – demonstrates that defence related and dual use activities are delivering a broad range of outputs and outcomes** and that these outputs and outcomes are very well aligned with the Thematic Objectives of the Cohesion Policy for the programming period 2014-2020. They were grouped into six thematic areas, namely:
 - i. Investment in applied R&D
 - ii. Funding prototypes, piloting, demonstration and testing
 - iii. Developing networks, research and innovation ecosystems
 - iv. Enabling infrastructure (physical and digital), tools, ranges, platforms, standards
 - v. Furthering advanced manufacturing and transition to Industry 4.0
 - vi. Increasing skills through training

8. **There is a wide geographical distribution, although Germany, France and Italy account for over half of projects identified.** There is some awareness of the use of structural funds for defence related and dual use across Member States, although wider communication of the alignment between defence sector objectives and the stated outcomes/priorities of ESIF could increase the contribution made by the defence sector in the next programming period.

9. **A wide range of activities can be noted, with the bulk of co-financed projects being ‘innovation-related’.** Nearly a quarter of all identified projects have concentrated their activities towards the “development of tools and instruments or enhancing existing ones”. The next category relates to activities that have to do with “transfer of knowledge” (17% of the total). Thirdly, very much in line with the innovative aspect of many of the projects, “skills development and/or enhancement” types of activities (seminars, trainings, capacity building) were included in 14% of projects

10. **ESIF wider Thematic Objectives 1 (innovation), 3 (competitiveness) and 10 (skills development) are at the top of the list in terms of funding provided.** In terms of the level and how the various EU’s Cohesion Policy Thematic Objectives have contributed to support defence related and dual use projects, out of the 11 Thematic Objectives supported by ESI Funds, Thematic Objective 1: Research, technological development and innovation has been the “*largest enabler*”, something which is fully coherent due to the highly technical level of the projects and their innovative component (65% of the total fall within this Thematic Objective 1). Following Thematic Objective 1 as the “key enabler”, Thematic Objective 3 focusing on the competitiveness of SMEs and the business community can be found, followed by Thematic Objective 10 on education, training, skills and lifelong learning, covering the naval/maritime sectors, micro and nanoelectronics and advanced materials.

11. **The analysis suggests that defence related and dual use activities can make an important contribution to the next programming period (2021-2027),** as there is strong potential for tapping into these funds for the purpose of defence related and dual use projects and activities. The main reason for this is the existence of Policy Objective 1A (Smarter Europe), and the specific focus of ERDF 2021-2027, which very much resembles with the 2014-2020 Thematic Objective 1 (research, technological development and innovation), that was by far the largest supported thematic objective by defence and dual use projects. Thus, this alignment in some of the ERDF policy priorities in between both programming periods indicate that there will be a similar (if not stronger) scope for funding dual use and defence related projects.

12. **Regarding the correlation between Regional Smart Specialisation Strategies and the identified projects it is observed that explicit reference to defence and dual use in regional strategies translates into more defence related and dual use projects.**

Résumé

Cette étude a été sollicitée par l'Agence Exécutive pour les Petites et Moyennes Entreprises (EASME) à Ecorys le 3 février 2020 afin d'étudier la contribution du secteur de la défense au développement régional au travers des Fonds Structurels et d'Investissement Européens (Fonds ESI).

Les Fonds ESI peuvent être utilisés par les États Membres dans le secteur de la défense dès lors qu'ils contribuent à la réalisation des objectifs du fonds en question, à savoir (i) cofinancer des projets d'investissements productifs, et (ii) soutenir la modernisation des chaînes d'approvisionnement de la défense. Les industries de la défense peuvent concourir à la réalisation des objectifs fixés dans le cadre des Fonds ESI, tels que la promotion du développement de l'économie régionale, avec un fort effet multiplicateur sur les investissements en matière de développement des compétences, des emplois, de la technologie et de l'économie.

L'**objectif général** de l'étude est de présenter la contribution des activités à double usage et de défense financées par les fonds ESI à la politique de cohésion de l'UE pour la période de programmation 2014-2020. Elle vise aussi à déterminer le potentiel de financement pour la prochaine période de programmation 2021-2027. Le **cadre géographique** de l'étude est composé par les 27 États Membres de l'UE ainsi que le Royaume Uni, qui a officiellement quitté l'UE peu avant le début de cette étude. Néanmoins, le Royaume Uni est inclus dans cette étude puisqu'il était totalement impliqué dans la mise en œuvre des Fonds ESI dans le cadre financier pluriannuel 2014-2020.

Ainsi, l'étude a été réalisée en trois parties :

La **première partie** consistait en une cartographie et un recueil de tous les projets liés aux activités liées à la défense et à des applications double usage mis en œuvre au niveau local/régional, national ou transnational et cofinancées par les Fonds ESI pendant la période 2014-2020. Le premier but était de créer une définition opérationnelle pour les projets de défense et double usage :

Un projet était considéré comme étant en lien avec la défense si un partenaire/bénéficiaire impliqué est identifié comme étant un acteur de défense et/ou si le projet a de possibles applications dans la défense. De plus, les projets pour lesquels les fonds n'ont pas été spécifiquement utilisés pour une application à double usage/défense mais qui contribuent à la modernisation et à la compétitivité du secteur de la défense ont également été inclus dans cette catégorie². Les projets pour lesquels une application dans la défense n'était initialement pas prévue mais dont les données de sortie/approche/technologie utilisées peuvent être adaptées pour une application de défense, ont été définies comme étant à double usage. Ensuite, l'Étude cartographiée harmonise l'information sur tous les projets liés à la défense et à des applications double usage ayant bénéficié des Fonds ESI pendant la période de programmation 2014-2020.

La **deuxième partie** implique l'élaboration de 20 études de cas portant sur des bonnes pratiques, et comprend également une présentation du cadre réglementaire des Fonds ESI actuel et futur et le lien avec des stratégies de spécialisation intelligente mises en place aux échelles nationales et régionales.

² Dans la pratique, la grande majorité des projets identifiés comme étant en relation avec la défense ont été identifiés comme tels parce qu'ils avaient une partie intéressée de la défense impliquée, plutôt que parce qu'ils provenaient d'une potentielle application de la défense.

Finalement, la **troisième partie** regroupe les recherches réalisées, la production d'une brochure d'information et l'organisation d'un atelier. Les principales conclusions de cette étude sont les suivantes :

1. **Le secteur de la défense a contribué de manière significative au développement régional pendant la programmation multi annuelle 2014-2020, au travers des Fonds ESI.** En particulier, les Fonds Structurels et d'Investissement Européens ont soutenu 972 projets à double usage et liées à la défense pendant la programmation multi annuelle 2014-2020. Les projets financés identifiés dans cette étude couvrent un large éventail d'activités, y compris le développement technologique, les équipements, l'infrastructure, la formation, l'internationalisation et les exportations, impliquant une série d'intervenants dans la chaîne d'approvisionnement allant des firmes multinationales les plus grandes aux micro-PMEs. L'investissement de 1,01 milliard d'euros des Fonds ESI ont permis de lever en complément 860 millions d'euros d'autres sources (y compris l'investissement de l'industrie de la défense). Les activités identifiées pendant cette étude s'alignent étroitement avec les objectifs affichés dans la programmation actuelle et à venir des Fonds ESI, d'après lesquels le secteur de la défense peut jouer un rôle significatif pour atteindre ces objectifs en accédant au financement d'ESIF.
2. **Aussi bien le Fonds Européen de Développement Régional (FEDER) que le Fonds Social Européen (FSE) ont tous deux joué un rôle dans le soutien des projets.** La plus grande part du soutien de financement des Fonds ESI vient du Fond Européen de Développement Régional, qui a consacré 814 millions d'euros pour cofinancer des projets liés à la défense et à des applications double usage. Le Fonds Social Européen a également joué un rôle et a investi 118 millions d'euros pour soutenir le développement de compétences et les opportunités d'emploi dans le secteur. Finalement, le Programme de Coopération Territoriale Européenne (INTERREG) a alloué 33 millions d'euros dans des projets de coopération transfrontaliers et transnationaux.
3. Indépendamment du fait que l'inventaire de projets identifiés offre une ample variété d'activités et de types de projets, en regardant dans le détail les caractéristiques des 972 projets soutenus par les Fonds ESI, **le projet le plus commun serait un projet financé par le Fonds Européen de Développement Régional, dont une société (comprenant aussi bien les PME que des grandes entreprises) est bénéficiaire principal, ayant une forte concentration sur l'innovation, la recherche et le développement technologique, un budget d'environ 100k d'euros et pouvant être considéré un projet « à double usage ».**
4. **L'éventail varié d'activités à double usage financées (et le nombre de parties intéressées impliquées) renforce la valeur ajoutée des technologies à double usage.** Près de 50% des projets financés (470) ont été classifiés comme contribuant à l'innovation, la recherche et le développement technologique, couvrant un large éventail de zones de technologie, des matériaux avancés à l'informatique quantique. Le financement de ces technologies à travers les Fonds ESI peut avoir un effet multiplicateur à travers un nombre de facteurs comme : en l'augmentation de la taille du marché (clientèle civile et de défense), la création de plus grands rendements (en rentabilisant l'investissement de R&D dans différentes applications), le développement de l'innovation (par une plus grande diversité d'opinion).
5. **Les projets à double usage représentent la majorité (58%) des projets supportés, suivis de près par les projets liés à la défense, qui représentent 42% des projets identifiés.** En moyenne, les projets à double usage sont davantage liés à l'innovation, la recherche et les développements technologiques (comme les nouveaux développements technologiques, les drones, les technologies de

coupe avec un laser innovateur) que les projets liés à la défense. Ils sont aussi plus liés au transfert technologique et de connaissance. Les projets en lien avec la défense mettent davantage l'accent sur le soutien aux entreprises et l'emploi. Les acteurs de défense sont impliqués dans des projets liés à la défense sont pour une majeure partie des sociétés de défense, aussi bien de petite que de grande taille.

6. **Les études de cas soulignent la complémentarité des compétences apportées par les acteurs de la défense et les acteurs civiles dans le cadre d'une collaboration.** Nombre des consortia identifiés pour des projets en relation avec la défense ont aussi bien des acteurs de défense que des acteurs non issus de ce secteur, provenant du secteur privé et du secteur universitaire. Les études de cas donnent quelques indications qualitatives montrant que dans ces cas, la complémentarité des compétences mises à profit par le consortium fait que le tout est supérieur à la somme de ses parties. A ce titre, l'intérêt régional des Fonds ESI est utile pour promouvoir de nouvelles relations et développer des clusters productifs.
7. **La macroanalyse des projets identifiés (et illustrés par les 20 études des cas) démontre que les activités liées à la défense et au double donnent une grande gamme de rendements et de résultats** et que ceux-ci sont très bien alignés avec les Objectifs Thématiques de la Politique de Cohésion pour la période de programmation 2014-2020. Ils ont été groupés dans six domaines thématiques, à savoir :
 - i. Investissement dans la R&D appliquée
 - ii. Financement de prototypes, de projets pilotes, de démonstrations et d'essais
 - iii. Développement de réseaux, d'écosystèmes de recherche et d'innovation
 - iv. Infrastructure habilitante (physique et numérique), outils, gammes, plateformes, normes
 - v. Amélioration de la fabrication avancée et transition vers l'industrie 4.0.
 - vi. Accroissement des compétences par la formation
8. **Il y a une large distribution géographique, bien que l'Allemagne, la France et l'Italie constituent plus de la moitié des projets identifiés. Les Etats sont sensibilisés à l'utilisation des fonds structurels dans le domaine de la défense et du double usage, bien qu'une plus grande communication de l'alignement entre les objectifs du secteur de la défense et les priorités/résultats des Fonds ESI indiqués pourrait augmenter la contribution du secteur de la défense dans la période de programmation suivante.**
9. **Un large éventail d'activités peut être identifié, la plus grande partie des projets cofinancés étant « en relation avec l'innovation ».** Près d'un quart des projets identifiés ont concentré leurs activités sur le « développement d'outils et instruments ou l'amélioration de outils existants ». La catégorie suivante d'activités se rapporte à des activités en lien avec « le transfert de savoir » (17% du total). Troisièmement, et très en ligne avec l'aspect d'innovation de plusieurs des projets identifiés, « le développement de compétences et/ou amélioration » de ce type d'activités y compris les séminaires, les formations, le renforcement des capacités sont inclus dans 14% des projets.
10. **Les Objectifs Thématiques des Fonds ESI 1 (innovation), 3 (compétitivité) et 10 (développement de compétences) figure en haut de la liste en termes de financement apportés.** D'un point de vue du niveau et de la manière dont les différents Objectifs Thématiques de Politique de Cohésion de l'UE ont contribué à soutenir des projets à double usage et des projets de défense, à part les 11 Objectifs Thématiques financés par les Fonds ESI, l'Objectif Thématique 1: Recherche, développement technologique et innovation a été le "*plus grand catalyseur*", ce qui est cohérent en raison du niveau

hautement technique des projets et leur composante d'innovation (65% de la baisse total dans l'Objectif Thématique 1). L'objectif thématique 1 en tant que "catalyseur clé", l'objectif thématique 3, axé sur la compétitivité des PME, est suivi par l'Objectif Thématique 10 sur l'éducation, la formation continue, couvrant les secteurs maritime/naval, micro et nanoélectronique et matériaux avancés.

11. **L'analyse suggère que les activités à double usage et de défense peuvent hautement contribuer à la période de programmation suivante (2021-2027)**, dans la mesure où ces fonds constituent de réelles opportunités de financement pour des projets et activités à double usage et de défense. La principale raison pour cela est l'existence de l'Objectif de Politique 1A (l'Europe Intelligente), et l'intérêt spécifique du FEDER 2021-2027, qui ressemble beaucoup à l'Objectif Thématique 1 de cette période 2014-2020 (recherche, développement technologique et innovation), qui était de loin le plus grand objectif thématique soutenu par des projets à double usage et de défense. Ainsi, cet alignement de certaines des priorités politiques du FEDER entre les deux périodes de programmation indique qu'il y aura un champ d'action similaire (sinon plus important) pour le financement de projets à double usage et liés à la défense.

12. **À propos de la corrélation entre les Stratégies de Spécialisation Intelligente Régionales et les projets identifiés on observe que la référence explicite à la défense et au double usage dans les stratégies régionales se traduit en plus par des projets à double usage ou liés à la défense.**

1 Introduction

This report is the result of a project commissioned by the Executive Agency for Small and Medium-Sized Enterprises (hereinafter EASME) to Ecorys on the 3rd February of 2020, to undertake the Study on the Contribution of the defence sector to Regional Development through the European Structural and Investment Funds.

The **general objective** of the Study was to provide an overview of how and to what extent defence related and dual use activities funded by European Structural and Investment Funds have been integrated in and contributed towards the framework of the EU's Cohesion Policy for the programming period 2014-2020, as well as considering the potential for the forthcoming 2021-2027 programming period.

The **specific objectives** can be narrowed down to: (1) addressing the information gap on dual use and defence related activities co-financed by the ESIF; (2) providing evidence on the range of contributions made by the defence related and dual use activities in support to the objectives and main priorities of the Cohesion Policy; (3) drawing conclusions from the collected evidence and developing guidance for defence related stakeholders regarding ongoing as well as potential upcoming opportunities for funding, to be disseminated to relevant stakeholders.

In addition to the general and specific objectives outlined above, the Study also had the following **cross-cutting objectives**:

- Taking stock and providing evidence on the positive impact on **SMEs** attributed from ESIF funds used for dual use and defence related activities;
- Exploring links to **smart specialisation (particularly R&I projects) in regions**;
- Consolidating and utilising **existing databases and studies**;
- Carrying out activities in view of developing **concrete conclusions and guidance** to be clearly disseminated to relevant stakeholders.

The **geographical scope** of the Study was all 27 EU Member States as well as the United Kingdom, who formally left the EU shortly before the start of this study. Nevertheless, the UK is included in this study as it was fully involved in the implementation of ESIF in the Multiannual Financial Framework (MFF) 2014-2020.

The type of defence related and dual use projects that fell into the scope of this study were the projects eligible for ESIF support in the 2014-2020 programming period.

In terms of the **types ESIF of funding** examined, the Study focused on projects funded under:

- the European Regional Development Fund (ERDF);
- INTERREG;
- the European Social Fund (ESF);
- the Cohesion Fund (CF).

The **timeframe** of the Study encompassed two MFF programming periods: 2014-2020 and 2021-2017. Concretely, the Study provided evidence on projects concluded or being carried out in the 2014-2020 period. Nevertheless, the strategic framework for the 2021-2017 programming period is also considered, in order to explore the future funding opportunities for defence related and dual use projects from 2021 onwards.

2 Background and policy context

2.1 EU Cohesion Policy: European Investment & Structural Funds

Cohesion Policy is the EU's main investment policy, targeting regions and cities in the EU in order to reduce regional disparity, support job creation, business competitiveness, economic growth, sustainable development and improve citizens' quality of life³. In the period 2014-2020, approximately 32.5% of the EU budget (351.8 billion euros) was allocated to funding instruments that provide structural and investment financing across the the EU and support Cohesion Policy⁴.

These instruments come in the form of the **European Investment & Structural Funds (ESIF)**, which provide the necessary investment framework and direction to meet the **Europe 2020 Strategy goals**.⁵ Amongst others, ESIF funds notably comprise the European Regional Development Fund (**ERDF**)⁶, including **INTERREG**⁷ and the European Social Fund (**ESF**)⁸. All of them are covered by Regulation (EU) No 1303/2013 of the European Parliament and the "Common Provisions Regulation". Their management is shared between the European Commission and the Member States.

The **Europe 2020 Strategy** defined the objectives of Cohesion Policy for the programming period (2014-2020). Specifically, it is a strategy aimed at achieving a **smart, sustainable and inclusive growth**. In order to gear Cohesion Policy more fully towards the Europe 2020 Strategy objectives, a **Common Strategic Framework** was drawn up for all Member States. This outlined the strategic approach to the 2014-2020 programming period and was drawn up for the alignment of Cohesion Policy with the objectives set by the Europe 2020 Strategy. The framework defines a series of Thematic Objectives and Investment Priorities that shape the determinations of national targets. The 11 Thematic Objectives in the 2014-2020 programming period (which ought to ultimately achieve Smart, Sustainable and Inclusive Growth⁹) were the following:

3 An introduction to EU Cohesion Policy 2014-2020". Available at:

https://ec.europa.eu/regional_policy/en/information/publications/brochures/2014/an-introduction-to-eu-cohesion-policy

⁴[https://ec.europa.eu/regional_policy/en/policy/what/glossary/c/cohesionpolicy#:~:text=Cohesion%20policy%20is%20the%20European,its%20Member%20States%20and%20regions.&text=174\)%2C%20the%20EU's%20cohesion%20policy,level%20of%20development%20between%20regions](https://ec.europa.eu/regional_policy/en/policy/what/glossary/c/cohesionpolicy#:~:text=Cohesion%20policy%20is%20the%20European,its%20Member%20States%20and%20regions.&text=174)%2C%20the%20EU's%20cohesion%20policy,level%20of%20development%20between%20regions).

5 Webpage of the Europe 2020 Strategy. Available at: https://ec.europa.eu/info/business-economy-euro/economic-and-fiscal-policy-coordination/eu-economic-governance-monitoring-prevention-correction/european-semester/framework/europe-2020-strategy_en

⁶ The main aim of the ERDF is to reduce regional disparities within the Union by supporting programmes that address regional development, economic change, enhanced competitiveness and territorial cooperation.

⁷ The European Territorial Cooperation (ETC), better known as INTERREG, is supported by the ERDF. It offers cross-border and interregional funding for public authorities, agencies, research institutes and clusters which work in the areas of research and innovation, SMEs competitiveness, low-carbon economy or environment and resource efficiency

⁸ The main aim of the ERDF is to reduce regional disparities within the Union by supporting programmes that address regional development, economic change, enhanced competitiveness and territorial cooperation. Funding priorities occur across the above 11 thematic objectives, with an emphasis on research, innovation environmental protection as well as infrastructure investments in least developed regions.

⁹ "Regulation (EU) No 1303/2013 of the European Parliament and of the Council of 17 December 2013". Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32013R1303&from=EN>

Table 1: Thematic objectives ESIF

Thematic objectives ESIF (particularly ERDF, ESF, CF)	
1.	Research and innovation
2.	Information and Communication Technologies
3.	Competitiveness of Small and Medium-Sized Enterprises (SME)
4.	Shift to a low-carbon economy
5.	Climate change adaptation and risk management and prevention
6.	Environmental protection and resource efficiency
7.	Sustainable transport and disposal of congestion on major network infrastructure
8.	Employment and support for labour mobility
9.	Social inclusion and poverty reduction
10.	Education, skills and lifelong learning
11.	Increased institutional capacity and effectiveness of public administration

2.2 The increasing synergies between civil and defence technologies

It has long been recognised that the European Defence Technology and Industrial Base (EDTIB) plays an important role in **economic development and growth within the EU**. It is also regionally important with clusters of activity across the EU. In this regard, the EDTIB is highly innovative and largely focused on high-end engineering and technologies, with cutting-edge research that has created important spill over effects to other sectors, such as electronics, space and civil aviation. It follows that much of the activities and developments in the defence sector have had significant positive civilian (i.e. dual use) implications – and vice versa¹⁰. Indeed, in recent years the synergies between the defence and civil sectors have increased markedly, leading to a significant rise in the technologies that can be classified as dual use.

In recent decades, the **innovation centre of gravity has shifted from defence to the civilian sector**. This is due to various reasons. One can be described as the decreasing budgets and investments into defence research over the last 10-15 years¹¹. Another reason can be described as the increasing importance of information and communication technologies (ICT) in all systems relying on commercial off-the-shelf (COTS) developments, such as mobile and handheld command-and-control computing capabilities. In addition to integrating civilian technologies, there are also greater opportunities to for the EDTIB to work jointly with the civil sector due to the closing gap between defence and security. This can be seen, for instance, in the space sector with many technologies common to both defence and civil applications and satellites carrying multiple payloads.

Transfers of civilian innovations to the defence context can be seen across the defence equipment spectrum, particularly in certain areas. For instance, civil spin-ins to defence applications are particularly relevant for the aerospace sector, given the shared uses of many aeronautical technologies, which are of relevance to both commercial and defence sectors in this domain. Data processing capability and electronic developments have also been critical to the changes in human-machine interface and have enabled the increasing autonomy of unmanned systems. Training has also been greatly influenced by spin-ins from video games, as technology from commercial entertainment is applied to defence simulation programmes.

¹⁰ <https://www.eda.europa.eu/what-we-do/activities/activities-search/dual-use-research>

¹¹ <https://sciencebusiness.net/news/defence-research-spending-still-falling-short-europe>

Finally, innovations in engines and hybrid technologies have been imported by the defence sector in order to capitalise on commercial developments for higher speed, efficiency and performance.

Given this increasing synergy between the civil and defence sectors, there has been a growing interest in **dual use technologies**, which have potential applications in a range of systems and across different applications.

At the same time, there has been an increasing role in defence for SMEs and non-traditional defence suppliers; while defence suppliers have diversified some of their offering to civil products and services.

2.3 Contextualising the link between ESIF and the EDTIB

ESIF can play a complementary role in the EDTIB alongside Member States' efforts in defence and the EU instruments outlined in the previous section. In particular, through encouraging collaboration in developing new technologies and equipment. Moreover, ESIF can be used by companies to improve cooperation between traditional defence actors and those operating in the civil arena: generating mutual benefits. Thus, ESIF can be used in the defence sector if its activities contribute to the objectives of the EU's Cohesion Policy. Projects in defence contributing to regional development within the meaning of Article 174 TFEU, may receive regional aid. The European Commission has made concrete moves in recent years to bridge ESIF with the EDTIB, namely through the adoption of a Communication and through launching the European Defence Action Plan.

More specifically, in 2013, the European Commission adopted a **Communication**¹² that set out a series of measures to boost the competitiveness of the EDTIB and strengthen the internal market for defence. This was complemented by an Implementation Roadmap entitled "Towards a more competitive and efficient defence and security sector" adopted in 2014. This package included actions in support of defence related Small and Medium-size Enterprises (SMEs) and skills needed by the defence industry, highlighting the potential use of the European Structural and Investment Funds (ESIF) in this context:

- a) The European Commission, together with the European Defence Agency (EDA), have organised workshops and seminars in various Member States to increase awareness about the potential of ESIF to support dual use and defence related activities. In 2014, the European Commission released a guidebook¹³ ("EU funding for Dual Use - A practical guide to accessing EU funds for European Regional Authorities and SMEs") for regional authorities and SMEs clarifying the possibility of using ESIF in supporting dual use projects. In addition, the EDA provided technical assistance to stakeholders¹⁴ that aimed to submit proposals for co-funding through the European Regional Development Fund (ERDF) and the European Social Fund (ESF). All this resulted in a number of successful applications.
- b) At the end of 2016, the European Network of Defence related Regions (ENDR)¹⁵ was launched by the European Commission. This Network enables EU regional authorities and regional clusters of excellence with important relevant industrial and research assets to share best practices in accessing ESIF, particularly to the benefit of SMEs, and integrating defence related priorities into their smart specialisation strategies.

¹² COM(2013)542 <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52013DC0542>

¹³ <https://eda.europa.eu/what-we-do/all-activities/activities-search/access-to-eu-funding>

¹⁴ <https://www.eda.europa.eu/what-we-do/our-current-priorities/eu-funding-gateway/esif-success-stories>

¹⁵ www.endr.eu

Moreover, in 2016, the European Commission launched the **European Defence Action Plan**¹⁶ (EDAP) based on 3 pillars: (1) launching the European Defence Fund (EDF), (2) fostering investments in defence supply chains; and (3) reinforcing the single market for defence. ESIF was presented as an important driver for actions under EDAP's second pillar. Specifically, it was stated that:

"ESIF may be used by Member States in the defence sector as long as they contribute to the objectives of the fund in question to (i) co-fund productive investment projects, and (ii) support the modernisation of the defence supply chains. Defence industries can contribute to the goals and the objectives set in the ESIF, such as promoting the development of regional economics, representing a high investment multiplier on skills, jobs, technological and economic development".

Moreover, it was stated that ERDF could fund defence and dual use activities in research and innovation, as part of a (regional or national) smart specialisation strategy. The European Commission committed to further promote such funding opportunities and invited local and regional managing authorities to support SMEs and intermediate companies active in defence supply chains.

¹⁶ COM(2016)950 <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2016:950:FIN>

3 Methodology and approach

3.1 Research methodology

This section presents a brief overview of the research methodology used in this study.¹⁷ The methodological exercises carried out can be specifically described in three different parts of the Study:

Part 1: mapping of all the projects with an identified defence or dual use relevance and analysis

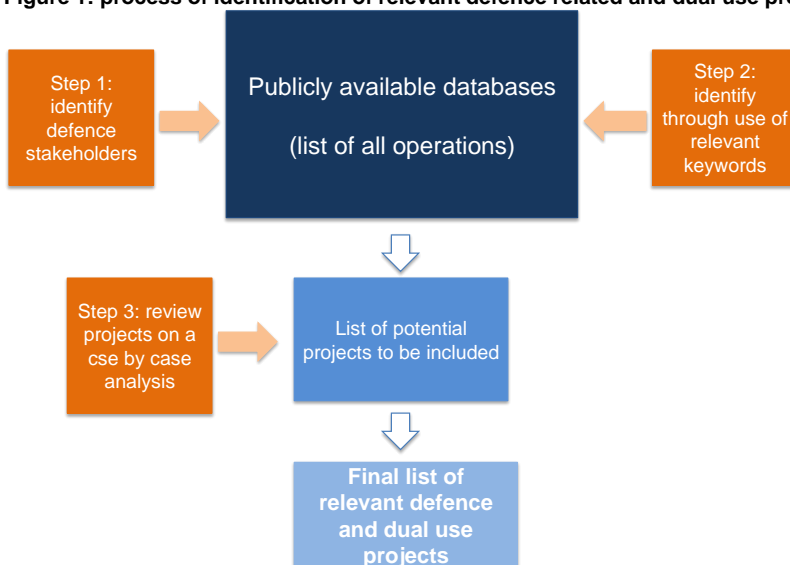
The initial part of the project focused on mapping and compiling all projects linked to dual use and defence related activities implemented at transnational, national or regional/local level co-financed by the ESIF during the period 2014-2020. The first goal was to map and harmonise information on all projects linked to dual use and defence related activities which benefited from ESIF during the 2014-2020 programming period.

The **sources** defined for the analysis of projects included:

- The databases from the “List of Operations” published for each Operational Programme
- <https://keep.eu/>
- https://ec.europa.eu/regional_policy/en/projects/
- https://ec.europa.eu/regional_policy/en/atlas/beneficiaries
- <https://ec.europa.eu/esf/main.jsp?catId=46&langId=en&list=1&theme=0&Member State=0&keywords>

The first task consisted of creating an operative definition of what is actually meant by dual use and defence related projects.

Figure 1: process of identification of relevant defence related and dual use projects



Our approach to identify dual use and defence related projects consisted of three steps. **First**, projects were screened for cases whereby a partner/beneficiary of the project was identified to be a defence stakeholder.

¹⁷ The challenges encountered and main lessons learnt from the methodological point of view can be found in Annex D.

In this regard, defence stakeholders consist of Ministries of Defence, Military Research organisations/institutes, Military Academies/universities, relevant clusters (such as those that are member of the ENDR) and defence companies (e.g. any company which is part of national defence associations lists and/or relevant catalogues from the Defence Industry). Importantly, this first step was applied throughout all the databases.

During the **second step**, taken in parallel to step 1, keyword searches were carried out on the publicly available databases again in their entirety. The list of keywords selected for the preliminary mapping exercise arised from a literature review undertaken, the specific documents provided by the European Defence Agency (mainly EU Capability Development Priorities) and several inputs from key stakeholders provided during the scoping interviews. The keywords were translated into each different language used in each database by our pool of experts.

As a result of the implementation of the first two steps, a list of potential projects was compiled. The projects in that list were further investigated during the **third step**, where project activities and outputs were examined in detail. The goal of the final step was to select only those projects that have clear defence or dual use relevance.

Approach to defining defence related projects

A project was labelled as defence related if a partner/beneficiary is identified as a defence stakeholder (for example, the projects identified in Step 1 described above) and/or if it originated with a potential defence related application. Additionally, in the specific case where the keyword search delivered certain projects for which the funding has not been specifically used with a clear defence/dual use application, but it did contribute towards the modernisation and increased competitiveness of the defence sector, they were included in the Study as “defence related” projects. This was the case for projects which have supported the modernisation of the defence supply chain.

Approach to defining dual use projects

Projects for which a defence related application was not foreseen initially, but outputs/ approach/ technology used could be adapted and show clear relevance to EU capability Development Priorities¹⁸, as defined by EDA, have been treated as dual use. For example, if a project uses drones for civil purposes but the approach could be adapted to meet defence needs such as surveillance, intelligence, early warning and threat detection; it would be classified as dual use. Similarly, a project using a Geographic Information Systems (GIS) software to produce maps of sea waters could also be used for maritime situational awareness purposes, as part of the naval priorities described by EDA¹⁹. Both examples could be classified as dual use projects. Such types of cases represented the largest proportion of the dual use projects.

This mapping exercise was followed by developing a characterisation of all the projects financed under ESIF, looking specifically at answering the following questions:

- Which projects were considered dual use and which were considered defence related projects? (type of projects)
- Who were the beneficiaries? (types of beneficiaries)

¹⁸ <https://eda.europa.eu/docs/default-source/eda-publications/eda-brochure-cdp>

¹⁹ ibid

- What level of investments by ESIF could be evidenced? -financial size of projects- (type of fund and project budgets)
- What themes and sectors? (types of topics covered)
- What range of activities? (types of activities)
- What results and effects? (types of results achieved)
- What is the contribution to regional development? (type of socio-economic development contribution)

Additionally, the screening of RIS3 at regional and national level was undertaken to identify references to dual use and defence related activities. The data collection for this activity was based mainly on the Eye@RIS3 tool of the Smart Specialisation Platform and the Regional Innovation Monitor Plus (RIM Plus) Platform. Eye@RIS3 provided information for the RIS3 strategic documents on regional and national level, on the covered economic and scientific domains by the RIS3 and the corresponding policy objectives.

Part 2: elaboration of good practice case studies

The second part of the Study consisted of the selection and elaboration of good practice cases as well as the analytical part of this assignment.

Good practices of defence related projects co-financed by ESIF were identified and the potential for further promoting the access to funds of the Cohesion Policy 2021-2027 was examined. A selection of 20 project fiches can be found in Annex A.

Utilising the input provided by the mapping exercise and the case studies, an overall analysis was carried out by synthesising the findings from the mapping of projects and smart specialisation strategies, the good practice cases, desk research and relevant interviews undertaken as part of the inception phase of the Study. Particular attention was paid to findings with regards to the impact of selected defence and dual use projects on the achievement of Cohesion Policy and Europe 2020 objectives as well as links with smart specialisation strategies.

Overview of the current and future Regulation Package

An overview of how defence related and dual use activities have been integrated into the EU's Cohesion Policy was elaborated. Doing so required several steps. Firstly, analysis of the Regulation Package for Cohesion Policy 2014-2020. Secondly, analysis of the forthcoming Cohesion Policy 2021-2027. The outcomes of this, along with the analysis developed on the categories of projects funded, were combined to begin the development of publicly available information on utilising funding at national, regional and local levels.

Link to regional and national smart specialisation strategies

The relationship between the national and regional level smart specialisation strategies²⁰ and the funded projects was examined. While defence related or dual use activities might be mentioned in the overall national or regional strategies, this does not necessarily translate directly into all regions of the respective

²⁰ National/regional research and innovation strategies for smart specialisation (RIS3 strategies) are integrated, place-based economic transformation agendas that ensure that ESIF can be used more efficiently and synergies between policies on different levels (EU, national, regional) and both public and private investments can be increased. The aim is to make innovation a priority for all regions. They align policy support and investments around key national/regional priorities, challenges and needs for knowledge-driven development.

Member State. Regions with more concentration of defence related enterprises, or those containing 'defence clusters' are more likely to include these activities in their strategies.

Once this mapping of the two levels was completed, a second step consisted of the analysis of how well the strategies reflected the number of ESIF funded projects in the respective regions and Member States. Finally, in order to provide a practical example of how dual use and defence related aspects were integrated into smart specialisation strategies, three concrete case studies have been carried out. The rationale of the selection of these and the three cases can be found under Annex B.

Additionally, the identification of defence related regions with no dual use/defence related ESIF projects was developed. Resulting from this analysis, there were no observable patterns that enabled the Study to draw solid conclusions on what factors lie behind the fact that no dual use nor defence related projects were identified for those regions. This can be found in Annex C.

Part 3: consolidation of research, drafting information brochure and conducting a workshop

The identification of projects, best practices and further analysis developed in Parts 1 and 2 of the Study fed directly into this third part, through the elaboration of an information brochure for all defence related stakeholders. This placed a particular emphasis on SMEs, identifying opportunities offered during the current ESIF programming period (2014-2020) as well as indicative opportunities for the next programming period (2021-2027).

Having conducted the analysis and drafted conclusions, a **workshop was organised** with experts and relevant organisations to discuss the outcomes of the Study and present the identified best practices. This event helped to validate and disseminate the emerging findings from the research carried out. Due to the Covid-19 restrictions, the workshop was organised virtually.

The workshop was carried out on the 19th of January 2021. Preliminary findings were presented and discussed with participating representatives of the organisations and institutions. Their inputs have been used for the revision of this final report. Additionally, three good practice cases were presented by the relevant beneficiaries and Managing Authorities.

This activity cemented the Study's conclusions on how the potential of ESIF to co-fund defence related activities can be promoted and their access to potential beneficiaries be facilitated, considering the different levels of stakeholders involved.

4 Analysis and findings

4.1 Outcomes of the research

The analysis contained in this section is derived from the mapping exercise conducted by the team. It provides an in-depth analysis of all the projects identified, that enables us to characterise the identified projects and also draw on the analysis of the 20 case studies developed.

The mapping identified a total of 972 ESIF-supported projects that are defence related or dual use. Approximately 40% of these projects are identified as defence related, while the rest (approx. 60%) are dual use. In terms of funding, the majority of the projects (approx. 83%) are supported by ERDF. The ESF supported 107 (11%) projects, while the role of the Cohesion fund (8 projects) and the ERDF/INTERREG (15 projects) programmes were minor. The total ESIF support for the identified defence related and dual use projects stands at 1.012 million euros and 81% comes from ERDF. The share of the ESF support is approximately 12%. When looking at the types of funds for the two project typologies, ERDF has funded more dual use projects (499) than defence related (309), whilst the ESF has funded more defence related projects (77) than dual use (30).

Figure 2: Distribution dual use and defence projects, % of total

■ Dual-use ■ Defence-related

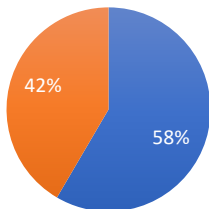
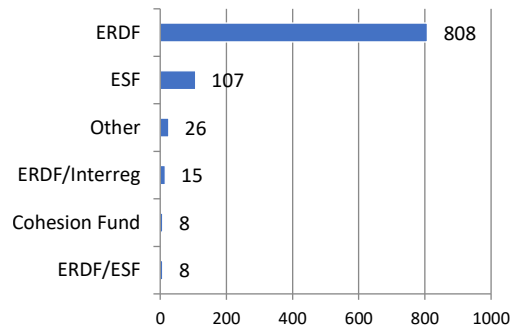


Figure 3: Distribution of projects based on ESIF fund, number of projects



* Other includes EMFF and projects where ESIF support could not be allocated to a specific fund

Figure 4: Distribution of projects' funding based on ESIF support, million euros

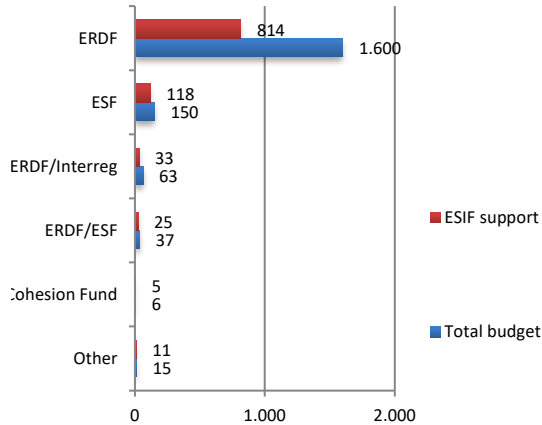
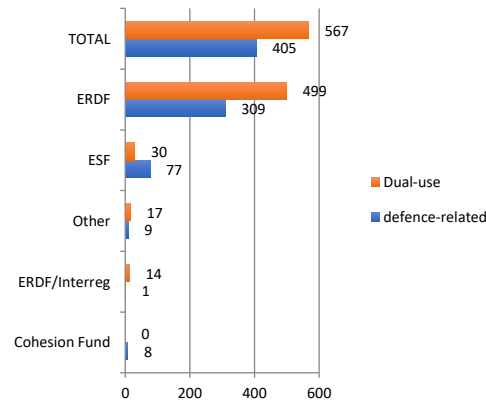
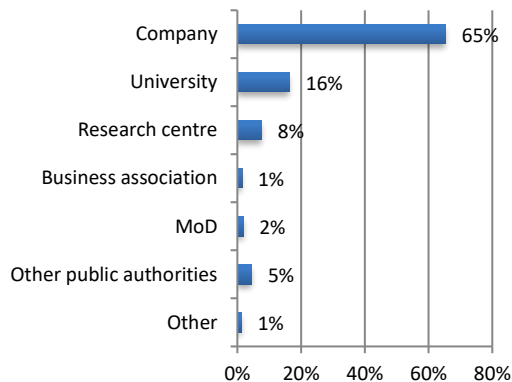


Figure 5: Distribution of projects based on ESIF fund project typology, number of projects



* Other includes EMFF and projects where ESIF support could not be allocated to a specific fund

Figure 6: Distribution of projects by type of lead partner, % of total



* Other includes military university, college, and NGOs or network of NGOs

Most of the projects were identified in Germany, France and Italy. The three Member States account for 469 of all identified projects. Spain (45), Greece (42) and the UK (41) each have more than 40 projects that were identified. Greece is a special case, as the number of projects there reflects a sequence of identical projects implemented in different regions by the Ministry of Defence: projects aimed at improving the living conditions of the military staff by renovating military facilities that contained asbestos elements. No projects were identified for Cyprus, which makes it the only Member State where no projects have been mapped.

Projects that relate to **space and aeronautics** (including location-based technologies and remotely piloted aircrafts) are amongst the most common. Out of the 11 Capability Development Priorities²¹, three are

²¹ <https://www.eda.europa.eu/docs/default-source/eda-publications/eda-brochure-cdp>

dedicated to the air domain (Air superiority, Air mobility and Integration of military air capabilities in a changing aviation sector) while the Space-based information and communication services priority relates to location-based and space technologies.

Another group of projects worth highlighting in this analysis on main features and patters, are those related to **information and cyber domains** (AI, advanced/high performance computing, big data and data mining, broadband/spectrum and other technologies, cloud and quantum computing) that relate to the Capability Development Domains of Enabling capabilities for cyber responsive operation and Information superiority.

Projects that cover **naval/maritime**-related activities and research in **advanced materials and nano technologies** are the remaining two identified groups. The correspondence with the Capability Development Domains for the naval-related projects is easy to identify. On the other hand, the advanced materials projects are difficult to be associated with a specific priority as the topic is very wide and covers research activities focused on various areas of implementation (medicine, coatings, etc.).

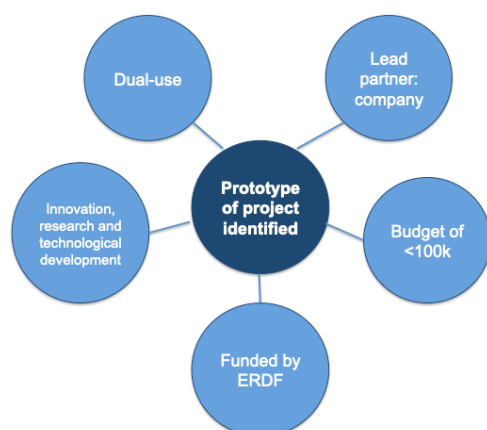
Innovation, research, and technological development as well as knowledge and technology transfer are the most common themes that the identified defence/dual use projects cover. At the same time, a significant number of projects that received support were related to boosting competitiveness and improving the supply chain outcomes (business support measures, supporting economic cooperation and clustering, mostly ERDF funded) as well as training and education (mostly ESF funded). A third group of projects cover horizontal topics such as labour market and employment and energy and energy efficiency.

4.2 In-depth analysis of all projects identified

4.2.1 Characterisation of projects financed under ESIF: developing a typology

From the analysis undertaken of the identified projects, a prototype of the most common project that is funded by ESIF under this study can be developed. Specifically, the project that is most commonly found is a dual use project, funded by ERDF, with a budget of under 100.000 euros, lead by a company and focused on innovation, research and technological development. However, this is just an overall view, and it should be taken into consideration that 42% of the identified projects are actually defence related, that ESF has also played an important role, and that there is a wide range in terms of project budgets.

Figure 7: Most common type of project identified

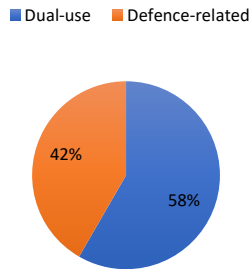


Additionally, with the information contained in the public database consulted, plus the additional research undertaken, there are different variables that offer different areas of analysis for the different projects. Below an analysis of these different variables is conducted.

4.2.1.1 *Project typology and types of beneficiaries involved*

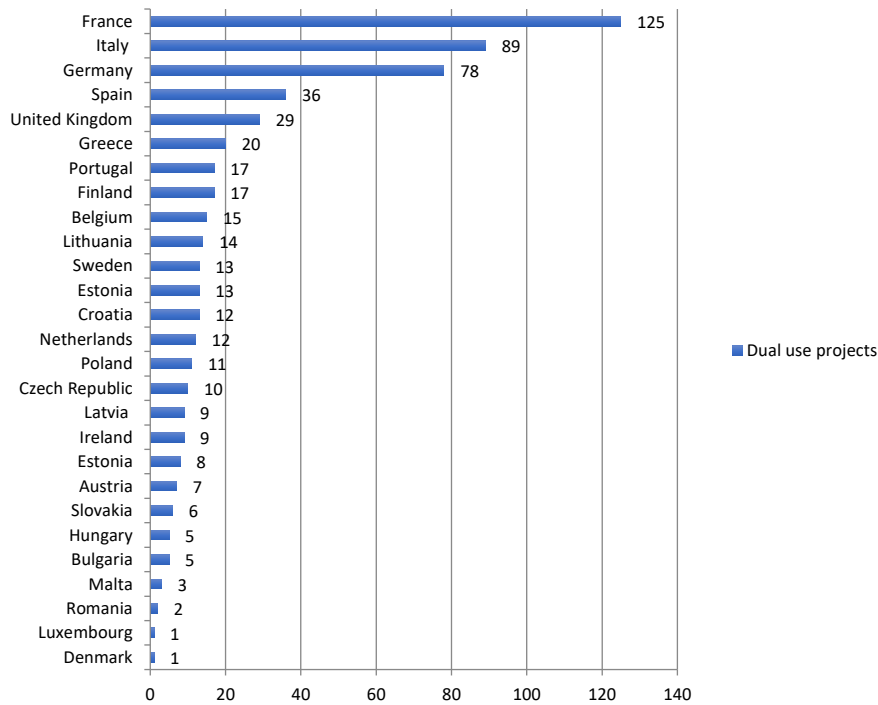
42% of the projects identified are defence related, while 58% are dual use.

Figure 8: Proportion of dual use and defence related projects



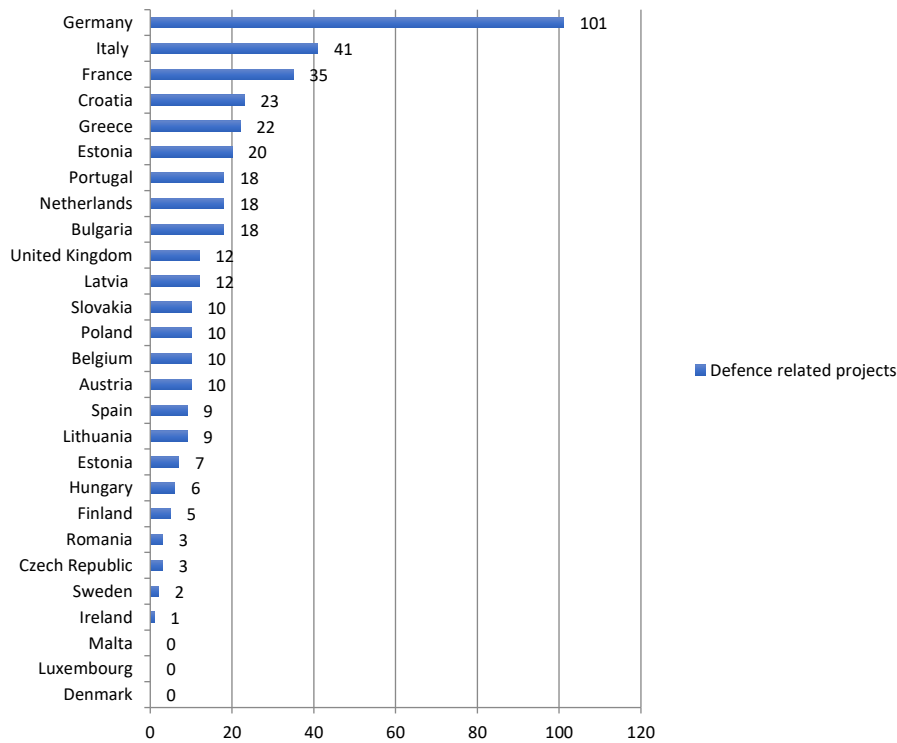
When it comes to absolute numbers of dual use projects, France, Italy and Germany are the Member States which concentrate the highest number of dual use projects, approximately 50% of the total number of dual use projects identified. This broadly aligns to Member States with a significant defence base. For instance, the Letter of Intent Member States are UK, France, Germany, Italy, Spain, and Sweden. Cyprus is the only Member State for which no projects are identified. By regional analysis, of the 281 NUTS2 regions in the 27 Member States and the UK, only less than half (116) do not have any identified projects. These regions are located in 15 Member States. Of these 116 regions with no identified projects, 16% belong to the United Kingdom, 16% to Germany and 11% to Poland. However there is no observable pattern in terms of concentration of regions with no identified project by level of economic development, geographical situation or industrial development.

Figure 9: Number of dual use projects, by Member State



These three Member States also concentrate the highest number of defence related projects, with Germany being by far the Member State that concentrates the highest number of defence related projects (101), followed by Italy (41) and France (35).

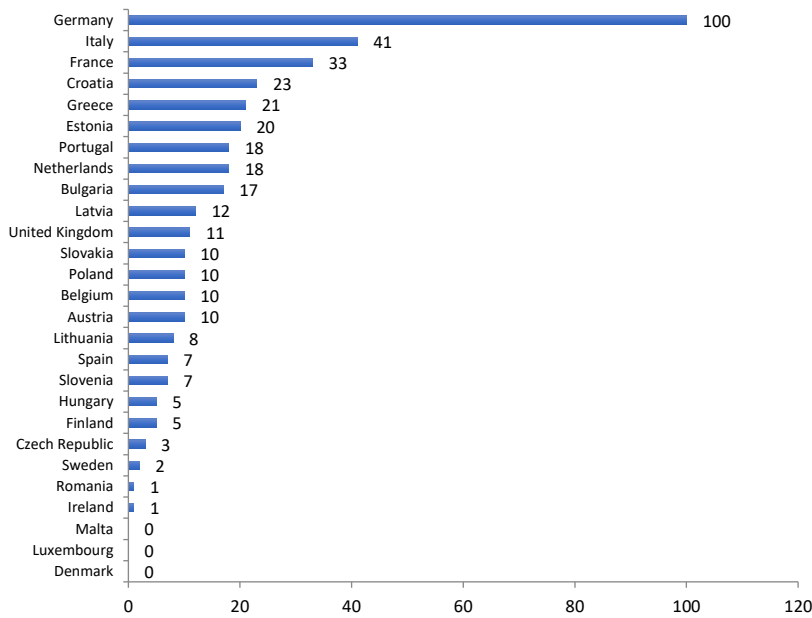
Figure 10: Number of defence related projects, by Member State²²



In direct relation to the number of defence related projects found, Germany is indeed the Member State that concentrates the highest number of projects with identified defence stakeholders (100), followed by Italy (41) and France (33), following the same pattern as for the number of defence related project. Therefore, Germany for instance has 101 defence related projects, of which 100 directly involve an identified defence stakeholder. Italy has 41 projects that are labelled as defence related, of which all of them directly involve an identified defence stakeholder. Defence stakeholders are understood to be stakeholders consisting of Ministries of Defence, Military Research organisations/institutes, Military Academies/universities, defence-related clusters, and defence companies (e.g. any company which is found in national defence associations lists and/or relevant catalogues from the Defence Industry and/or belongs to defence-related clusters).

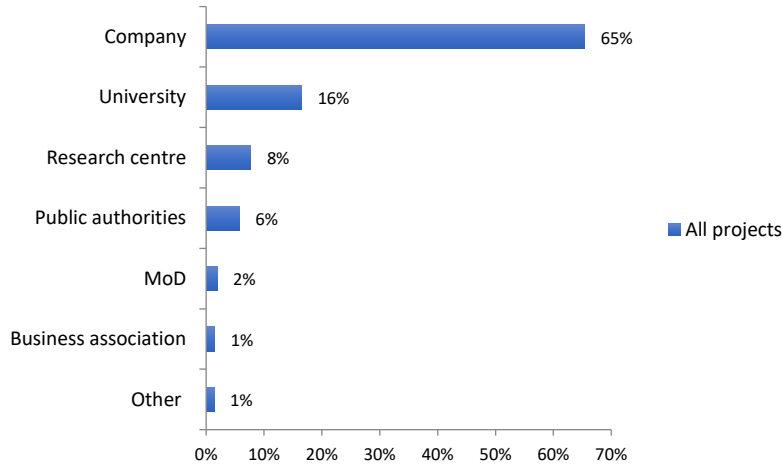
²² The relatively high number of identified defence related projects for Germany responds to the fact that there is a high number of small projects consisting of relatively small budgets aimed at individual companies in quite specific activities such as support of their participation to defence fairs as well as education qualifications, vouchers and training cheques for employees

Figure 11: Number of defence related projects with defence stakeholders identified, by Member State



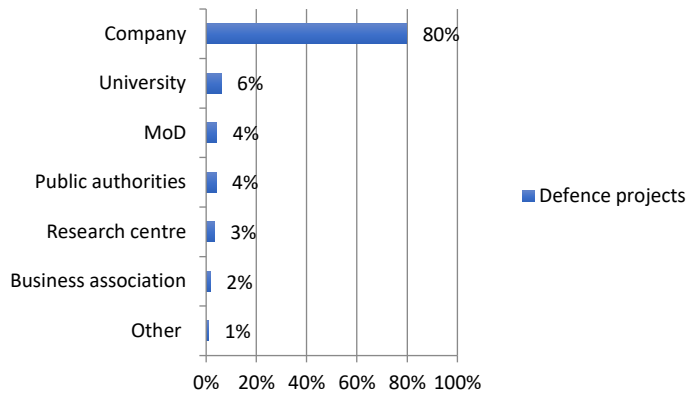
In terms of types of beneficiaries, the most common typology of beneficiary are companies. They represent 65% of the total number of beneficiaries identified, with universities and research centres representing approximately one quarter of the total number of beneficiaries (24% for both categories).

Figure 12: Types of beneficiaries, all projects



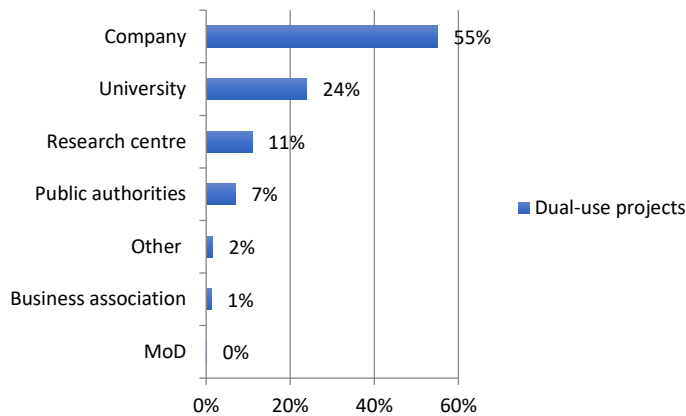
When focusing specifically on defence related projects, the percentage of beneficiaries that are companies increases to 80%, and Ministries of Defence represent 4% of all defence stakeholders identified.

Figure 13: Types of beneficiaries within defence related projects



By contrast, when focusing specifically on dual use projects, only about half of the total are companies (55%), and universities and research centres represent a much bigger category (totalling 33%).

Figure 14: Types of beneficiaries within dual use projects



4.2.1.2 Types of funds that have been used and analysis of project budgets

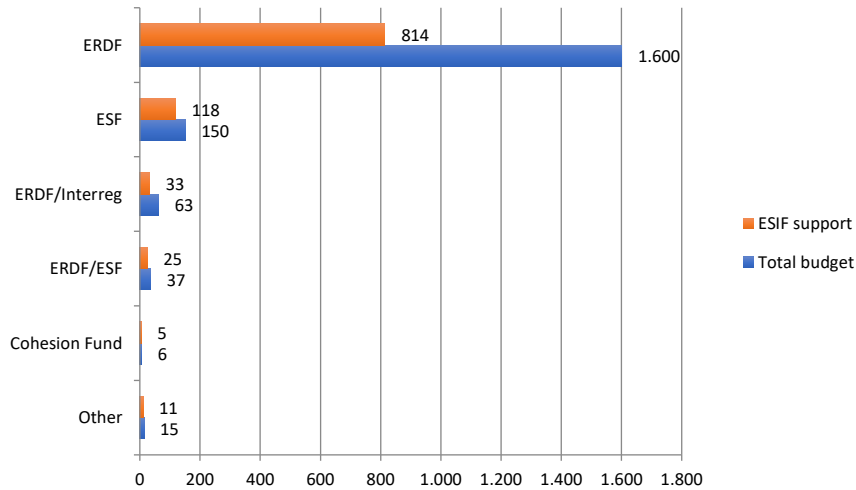
The total amount of funds allocated to the development of defence related and dual use projects during the 2014-2020 programming period amounts to 1.87 billion euros, of which 1.01 billion has been financed by the EU through different co-financing mechanisms. The EU contribution therefore stands at just over 1 billion euros.

The biggest funding support comes from ERDF 814 million euros of dual use and defence related projects are financed by the EU through the ERDF Fund, 118 million euros by ESF, 33 million euros by INTERREG, and 5 million euros by the Cohesion Fund.

Interestingly, ESF has a relevant contribution towards defence related projects. In particular, 77 projects labelled as defence related have been supported by ESF. Of these projects, 75% are related to the improvement of competences and skills. The majority of these projects have been focused on education and training (51%) and on employment and labour market themes (36%). These projects cover different levels of education, some refer to the acquisition of more basic skills, like some projects offering education vouchers and in-company training, while others involve very high level skills. Such high level skills include

higher education student mobility project involving the participation in international academic forums for supported students, PhD and post-doc students, young scientists and lecturers from the military university. Additionally, the most popular sectors that these projects focus on are aeronautics (18%), advanced materials (15%) and naval/maritime (13%).

Figure 15: Total and ESIF support (in million euros), by type of Fund



- Other includes EMFF and projects where ESIF support could not be allocated to a specific fund

Figure 16: Sectorial distribution for ESF funded, defence related projects

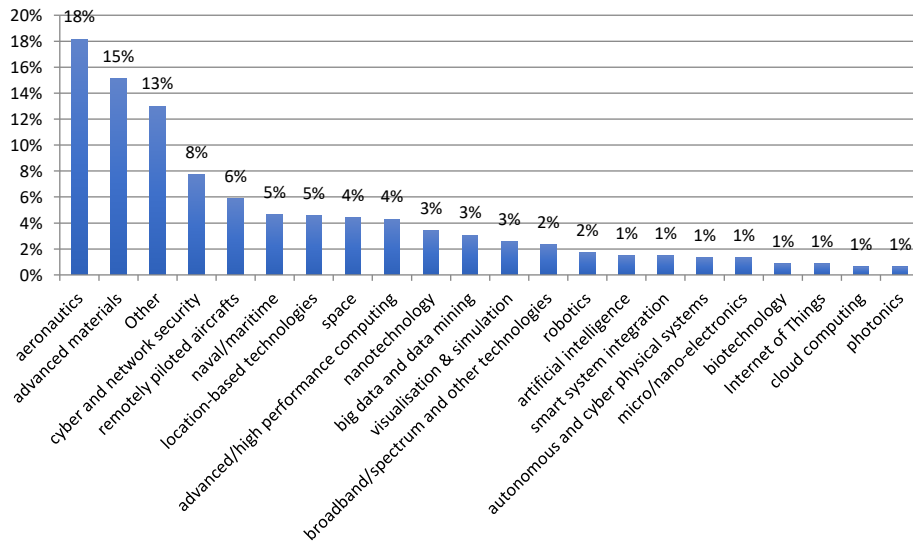
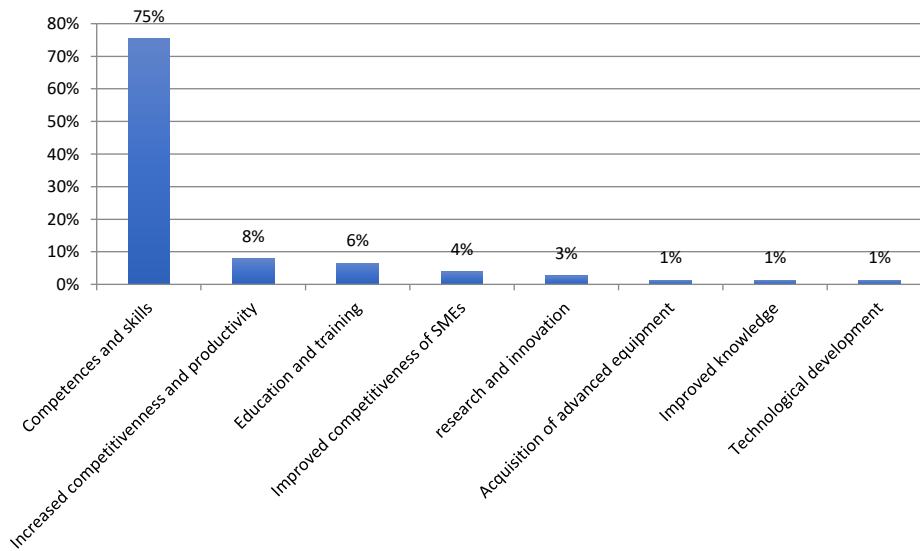


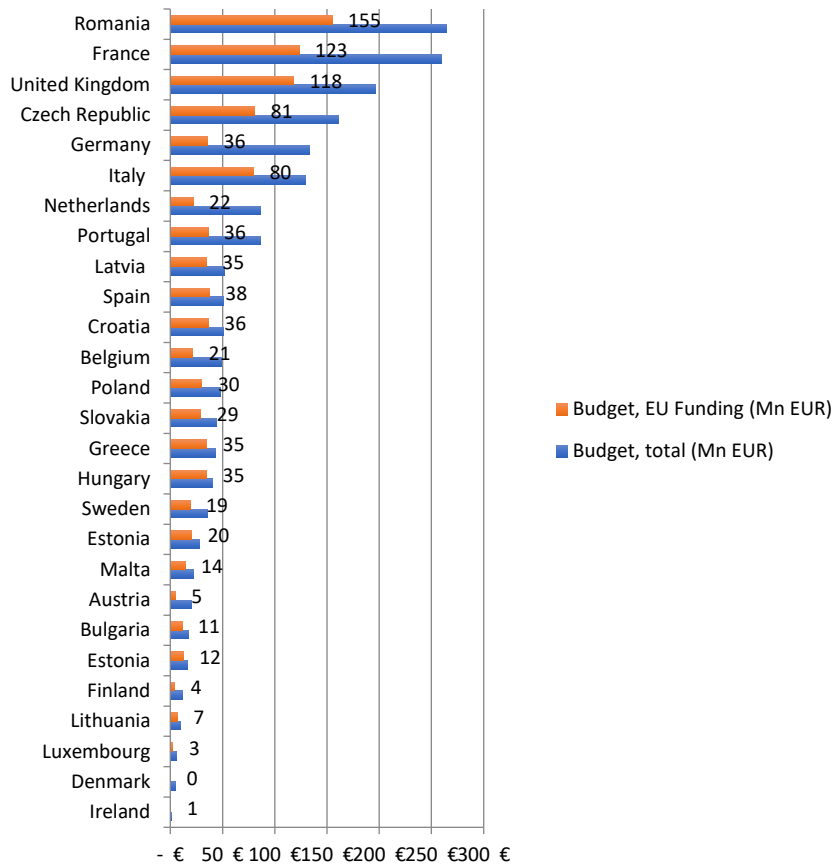
Figure 17: Socio-economic contribution of ESF funded, defence related projects



It is important to note that there is a lot of variation in terms of funding and project budgets by Member State. For instance, Romania has the largest budget, with 264 million euros of total budget and 155 million euros of EU budget. This is due to one specific and very large project, the “Extreme Light Infrastructure – Nuclear Physics” projects, which amounts to 256 million euros (of which 149 million euros are co-financed by the EU). It is part of a pan-European research project which also has facilities in the Czech Republic and Hungary, aiming to promote national and European research in related scientific areas by creating internationally recognised infrastructure open to researchers from academia, the private sector and business. The project is expected to tackle Romania's main research, development and innovation challenges.

Besides Romania, France also stands out in terms of total funding, with 260 million euros of dual use and defence related projects (of which 123 are co-financed by the EU), followed by the United Kingdom (197 million euros in total budget with 118 million euros being co-financed by the EU). On the other side of the spectrum, there are Member States like Ireland, Denmark and Luxembourg, with total budgets below 6 million euros.

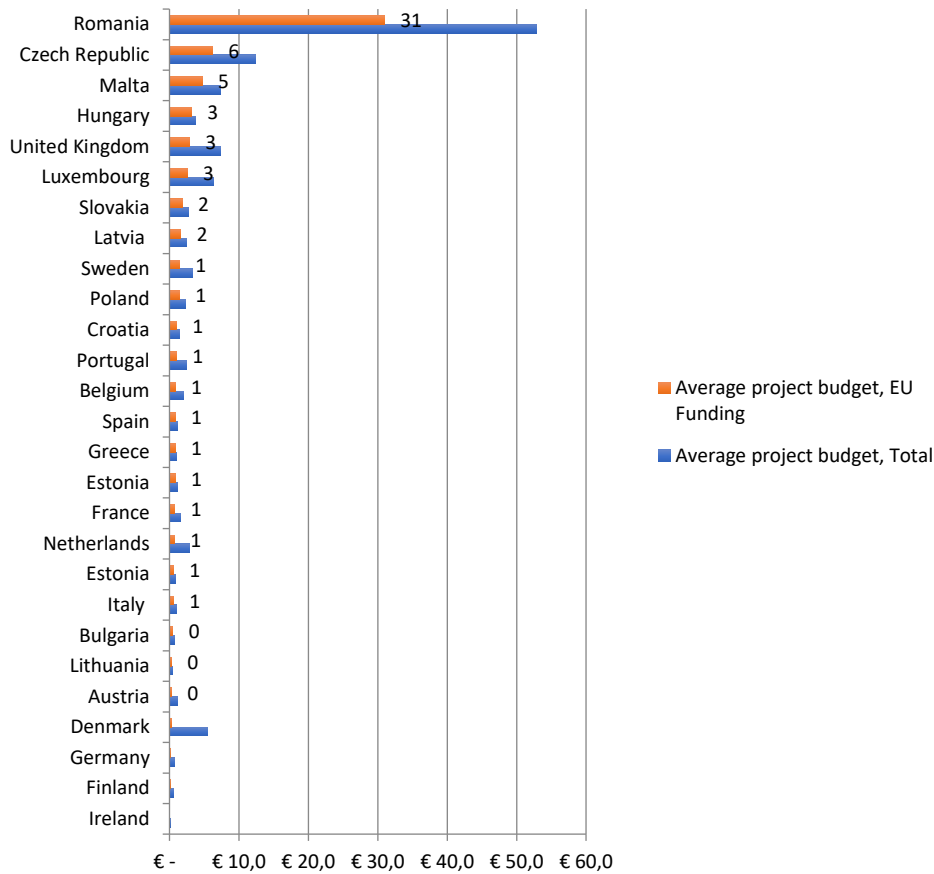
Figure 18: Total budgets and total EU funding, by Member State



The average total project budget for all Member States stands at 1.969.244 euros, with the average EU-funded budget standing at 1.052.999 euros. However, this average hides significant differences, with 25 projects having budgets over 10 million euros, 668 projects under 1 million euros and 227 projects budgets of less than 100 thousand euros. Therefore, even though the mean project budget stands at over 1 million, the median project budget is under 100k.

Looking at the average project budget by Member State, Romania again stands out as the Member State with the highest average budget (although this is driven by the one project commented on earlier), followed by the Czech Republic, which also has a project with an unusually large amount of funding, 149 million euros (total budget) for the AVA Centre for Industrial Development and Innovation.

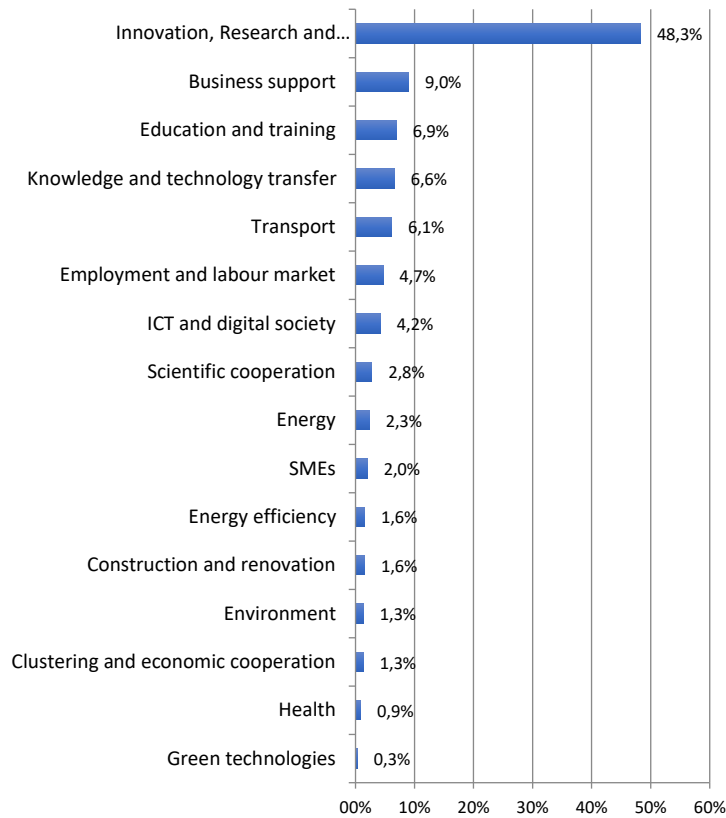
Figure 19: Average project budgets (Total and EU contribution, in million euros), by Member State



4.2.1.3 What themes and sectors are covered by the projects?

The analysis by project themes showcases the innovative character and level of technological development of the projects financed, with the majority of the projects’ thematic coverage relating to Innovation, research and technological development. Specific examples of such projects include an Austrian project on the development of innovative, future-oriented processes and materials for the production of carbon fibres, porous carbon materials and bio-based ceramics based on biogenic raw materials such as lignin and cellulose or a Bulgarian project involving research activities that focus on developing and implementation of innovative technology for production of a new product: an autonomous system for the production of hydro-oxygen mix using alternative energy for the needs of industrial boiler farm. Almost half (48%) of all projects fall under this category, followed by business support (9% of projects). An example of a defence related project involving business support is an Estonian project whose aim is to change the company's current business model, implement the necessary process and organisational innovations allowing them to export their products into foreign markets, for which a specific certification is required. Following them, the categories of education and training (7%), knowledge and technology transfer (7%), and transport (6%). The projects funded have a clear innovative and highly technical aspect, with many of them involving cross-cutting technologies. The themes that have less coverage in the identified set of projects are social inclusion, green technologies and health.

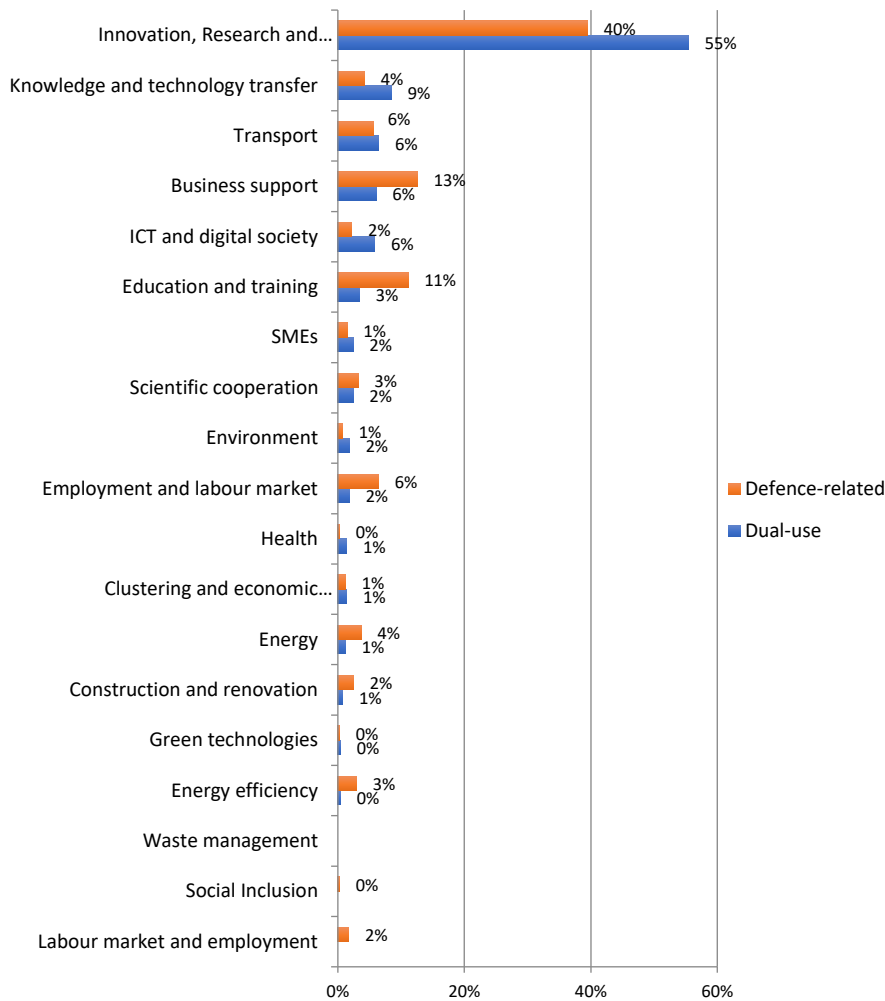
Figure 20: Percentage distribution of project themes, all projects



There are interesting differences in terms of thematic coverage to note between dual use and defence related projects. For instance, dual use projects tend to be on average more related to innovation, research and technological developments (such as new technological developments, drones, new laser cutting technologies) than defence related projects, and have more to do with knowledge and technology transfer. On the other hand, defence related projects have a bigger focus on business support, employment (both of these themes are related to projects involving the support of defence related companies, contributing to the overall improvement of the sector), energy and construction projects.

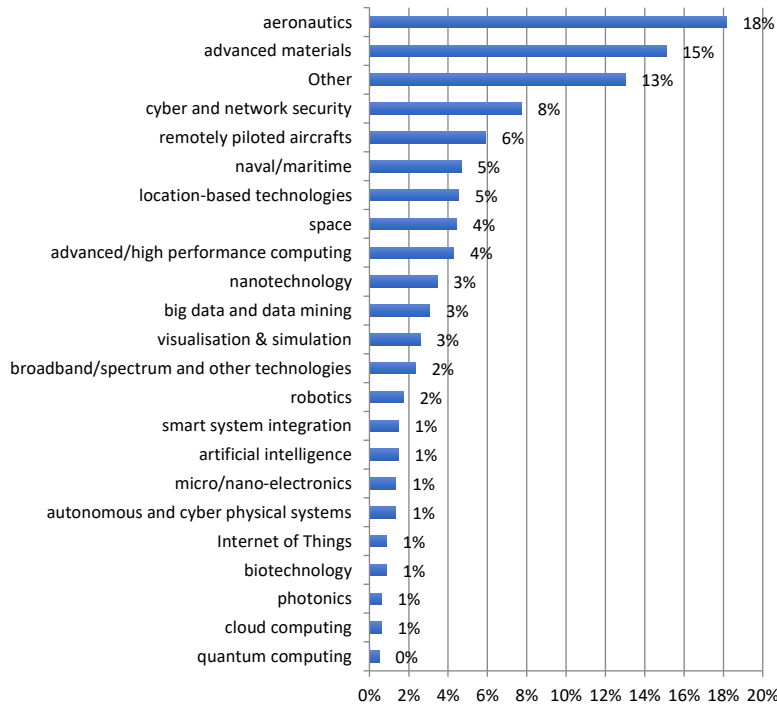
Even though the link between project themes and the ESIF 11 Thematic Objectives is not available in the public databases, an approximation between the link between project themes and Thematic Objectives (and corresponding Investment Priorities) is provided in section 4.4 of this report.

Figure 21: Percentage distribution of project themes, by type of project



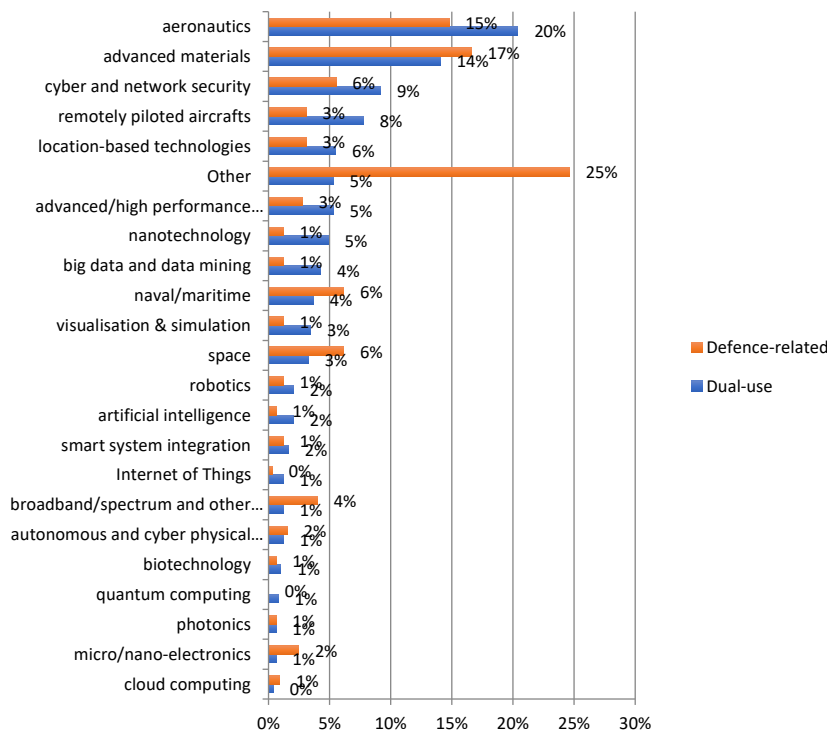
The predominant sector in which projects are classified is the aeronautics sector (20% of projects, including mostly projects related to the production of aircraft components, developing new production technologies, new processes, upgrading of industrial facilities, etc.), followed by advanced materials (14% of projects, including new product developments, advanced manufacturing technologies, surface modification, etc.) and a variety of projects included in the category “other” (13%). This category includes a wide range of projects, ranging from themes related to energy saving and efficiency, to networking and knowledge sharing, to procurement of new technologies or acquiring certifications, internationalisation of companies, and other types of business support. Cyber and network security (7%) also accounts for a relevant number of projects, including projects such as employee training on cyber security issues for defence stakeholders, intelligent systems for analysis of open sources, security platforms, strengthening cyber security of SMEs, etc.

Figure 22: Percentage distribution by sectors, all projects



Once again, there are interesting differences in terms of sectorial distribution of projects to note between dual use projects and defence related projects. The aeronautics, cyber and network security, and nanotechnology sectors concentrate a higher proportion of dual use rather than defence related projects. This is related to the fact that dual use projects have a greater thematic concentration in projects with a research, innovation and knowledge transfer focus. On the other hand, defence related projects are more present than dual use ones in sectors such as naval/maritime, space and the “other” category, which includes projects undertaken by companies which have been identified as defence stakeholders that contribute to the overall improvement of the defence sector, its competitiveness and its contribution towards economic development of the regions in which they operate.

Figure 23: Percentage distribution of project sectors, by type of project²³



4.2.1.4 Range of activities carried out with the support of ESIF

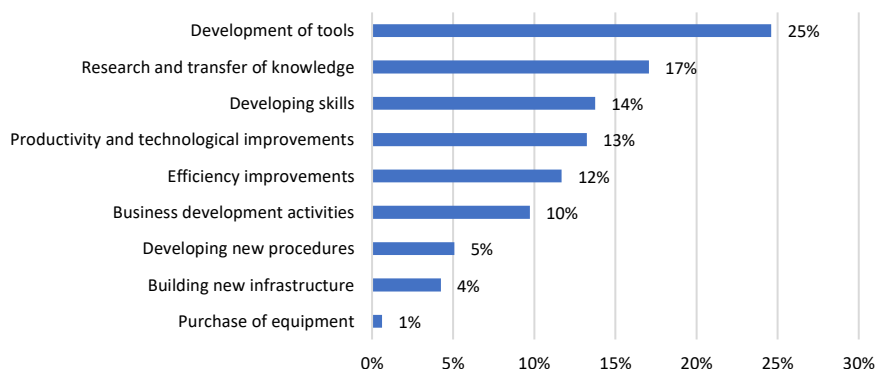
As a result of project development, the identified projects have carried out a range of activities that have led to different results achieved and contributed towards the development of their territories, two things that will be explored in the following sections. A quarter of the projects identified have focused their activities on **developing a new tool or improving an existing one**. For instance, the Belgian project Wearit4Health has the objective of creating a wearable multi sensor monitoring device that is comfortable for the hospitalized patients and compatible with the IT infrastructure of the hospitals. In order to do so, it has focused its activities on the development of the electronic hardware, the embedded software and the textile wearable substrate, which has involved many other activities, such as Knowledge-gathering, identification and test of sensors already available on the market and development of sensors from TRL4, data transfer, treatment and analysis, and test and validation. The main activity carried out however has been developing the tool per se, which is why it is classified in this manner.

The next category of activities developed includes **research and transfer of knowledge types of activities**, in line with the innovative aspect of many of the projects identified, followed by (and linked closely to) the development of new skills. For example, one of these projects is the Croatian STIM-REI project aiming at long-term collaboration between academia and entrepreneurship. As such, the project combines research (R) with innovation (I) and education (E) through three project elements: advanced non-social technology; water and environment; and education.

²³Included in the category “other” are generally projects that contribute towards the overall improvement of the defence sector and which cover a wide range of activities such as: attending international fairs, achieving specific certifications, developing cross-sectorial techniques, accreditations, designing and implementing emergency plans optimisation plan for a production plant, etc.

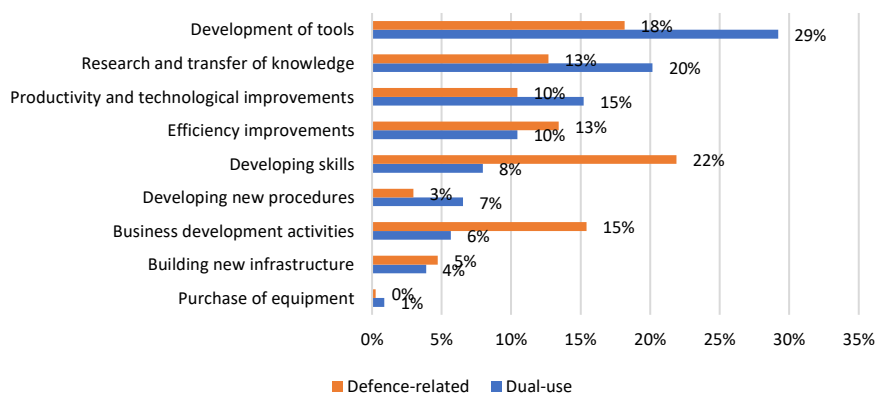
The rest of activities carried out include productivity and technological improvements, efficiency improvements, business development activities, developing new procedures and standards, building new infrastructure and the purchase of equipment.

Figure 24: Range of activities carried out



In terms of differences observed between dual use and defence related activities, defence related projects have focused much more on efficiency improvements, developing new skills, and business development activities. On the other hand, dual use projects have focused more on the development of new tools and research activities and transfer of knowledge, and productivity and technological improvements.

Figure 25: Range of activities carried out, by type of project

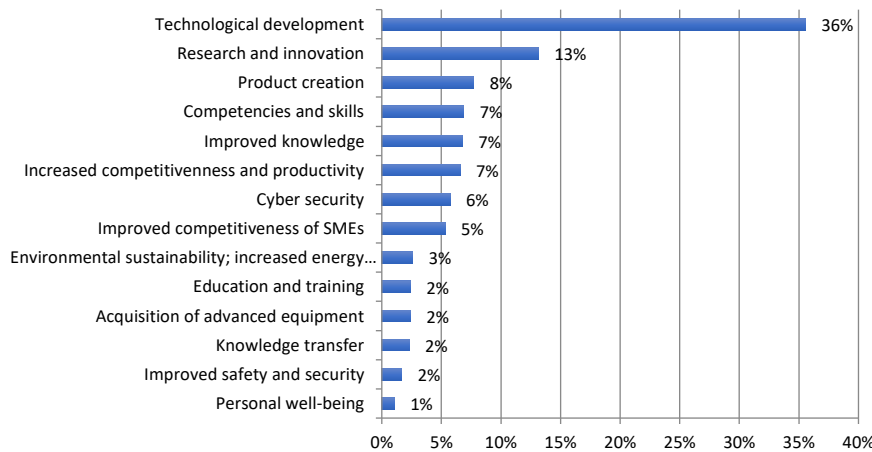


4.2.1.5 What has been the social/economic development contribution to regional development?

One key aspect of the projects identified during this study is their contribution towards socio-economic development of the regions in which they operate. This contribution comes from many different thematic areas and is contained in many different sectors, but in order to provide an overall idea of the ways in which these projects can contribute towards the regional development of their regions, they have been classified according to different criteria (see Figure 26 below). The majority of projects (36%) have been identified as contributing towards socio economic development through the provision of some kind of technological development (a new technology, a new way of doing things that results in an overall improvement, etc.). For instance, new technologies developed in Hungary as a result of a project that ensures the provision of an effective service in the long run and indirectly serve the effective reduction of risks in the field of public safety. This

project involves a comparison of methods for the detection of explosive devices, as well as the development of a complex technological procedure and quality assurance system, especially for the use of explosive detection dogs. Another example of a relevant technological development is the new ellipsometric measurement possibility in the mid-infrared spectral range for the analysis of 3D-structured surfaces for optical and biotechnical applications. 13% of the projects identified have a pure research and innovation focus, bringing new research techniques, developing a new invention or patent in the region. 8% of the projects have resulted in a new product creation, like the creation of an automated guided vehicle in Portugal for the factories, or the redesign of a helicopter in Italy to make it compatible with new regulations, enabling it to operate in other Member States. 14% of projects identified contribute to the development of competencies and skills (7%) and towards improved knowledge (7%) in the regions. Such examples include a project in France opening up the world of air and aeronautics to a public of young people who are neither in employment nor in education or another project providing young unemployed people with vocational training within the Guadeloupe Adapted Military Service Regiment according to the course they choose to integrate. Through aero modelling, these people will be put in a situation of discovery of the trades and jobs in the air and aeronautics accessible with a professional qualification or a level V diploma. Another example includes an Italian project, which aims to exploit the innovative potential of artificial intelligence and machine learning for the creation of innovative products in the field of artificial vision. Improving knowledge and competencies and skills of particularly vulnerable groups has a positive and direct correlation with the access of these groups to the labour market, increasing their chances of securing employment and contributing towards the economic development of the regions by increasing the skills of the workforce and attracting new types of businesses.

Figure 26: Areas of contribution towards socioeconomic development



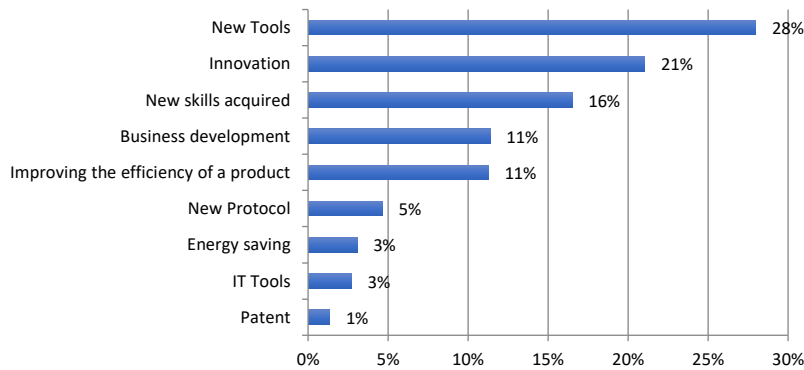
4.2.1.6 *Main effects and principal results achieved/planned*

Finally, there are tangible results achieved or planned that can be derived from the actual implementation of the different types of projects. In order to analyse them, results have been classified according to the classification seen in Figure 27 below. In terms of tangible results, 28% of the projects identified have created a new tool as a result of their activity. These include a wide range of tools, such as a Belgian project involving the creation of a tool that can be used during patients' treatment. The system created allows the creation of a health profile, or the integration of existing profiles, that stores the medical and social history of each patient, chronologically reflecting examinations, assigned therapies, reactions, etc. Another example is a

Latvian project that resulted in the creation of laboratory prototypes that allow human-computer interaction in small languages (endangered languages spoken by a minority of people).

A second type of projects have as a direct result of their activity the production of any kind of innovation in a research area (21%), plus 1% of projects involving the development of a new patent (the Lithuanian project patenting a compact folding drone with camera). Examples include an Italian project that aims to exploit the innovative potential of artificial intelligence and Machine learning for the creation of innovative products in the field of artificial vision, or a Spanish project developing a smart surveillance system for photovoltaic energy plants by integrating UAVs-drones into a Big Data platform to capture and process mass data. 16% of projects have had as a direct result the acquisition of new skills. For instance, a Swedish project that falls under this category has the purpose of answering competence gaps following new technologies by upgrading employee knowledge and skills to function within this reality. This will strengthen the individual's adaptability to change, and employability on the internal and external market.

Figure 27: Principal results achieved



4.3 Showcasing the use of ESIF for defence related and dual use projects: 20 good practice cases

As explained in Section 3.1, case studies have been carried out in order to clearly and concretely showcase how ESIF has been used by defence and dual use projects and activities in order to support regional development. Specifically 20 good practice projects supported under the ESIF for the period of 2014-2020 were carefully analysed by the project team and 20 good practice project fiches were produced (please see Annex A for the compilation of the 20 project fiches).

In this regard, empirical evidence has been gathered to highlight the value of investing defence related and dual use activities and underline the links between such investments with specific regional development strategies and the Europe 2020 Strategy.

4.3.1 Overview of the 20 good practice cases

In the table below the 20 good practice cases analysed as part of the Study are showcased. Some key descriptive information is included, on the project title, the Member State of origin, explanation of whether the project is defence related or dual use, the name of the project, the type of organisation the leader partner as well as the funding stream, the contribution of regional developed (based on typology explained below) and how much finance was provided by the EU.

Table 2: Overview of good practices

Project N°	Project title	Member State	Defence or dual use	Promoter / Lead partner	Type of organisation	ESIF	Contribution to regional development	EU co-financing ²⁴
P1	Support for the development of human resources and capacity National Military University for into a contemporary knowledge centre	Bulgaria	defence related	VASIL LEVSKI NATIONAL MILITARY UNIVERSITY	Military university	ESF	Developing networks, research and innovation ecosystems	€ 344,004
P2	Threod Systems development programme 2017	Estonia	defence related	Threod Systems	Company	ERDF	Funding prototype, piloting, demonstration and testing	€ 486,413
P3	Drone on the fly!	Finland	dual use	Savonia-ammattikorkeakoulu oy	University	ESF	Funding prototype, piloting, demonstration and testing	€ 49,500
P4	HNBi - Biomechanics of the cranio-encephalic and cervical system	France	dual use	Université de Strasbourg	University	ERDF/INTERREG	Enabling infrastructure (physical and digital), tools, ranges, platforms, standards	€ 467,910
P5	Construction of a Professional Training Division with the Adapted Military Service In Mayotte, RSMA-M	France	defence related	Régiment du service militaire adapté de Mayotte - RSMA	Public body	ERDF/ESF	Training and skills	€3,671,685

²⁴ Numbers have been rounded to the closest unit.

P6	Aerospace research project- In-Control	Germany	dual use	ExxpertSystems GmbH	Company	ERDF		€ 240,000
P7	Defence Forces Employment Support Scheme (ESS)	Ireland	defence related	Ministry of Defence	Ministry	ESF	Training and skills	€ 280,000
P8	Cyber Trainer Project	Italy	defence related	LEONARDO S.P.A.	Company	ERDF	Training and skills	€ 3,181,645
P9	IntegraM - Developing Spatial Data Integration for the Maltese Islands	Malta	dual use	Planning Authority of Malta	State authority	ERDF/INTERREG	Enabling infrastructure (physical and digital), tools, ranges, platforms, standards	€ 4,000,000
P10	Brain Computer Interfaces (BCI) experiment	Netherlands	defence related	Thales Nederland B.V.	Company	ERDF	Investment in applied R&D	€ 222,346
P11	DAIMON - Decision Aid for Marine Munitions	Poland	defence related	Institute of Oceanology, Polish Academy of Sciences	Research centre	ERDF/INTERREG	Enabling infrastructure (physical and digital), tools, ranges, platforms, standards	€ 3,524,946
P12	Active Protection Costume EOD	Romania	defence related	STIMPEX S.A	Company	ERDF	Funding prototype, piloting, demonstration and testing	€5,000,000
P13	Smart Clothes with control and alarm function	Slovenia	dual use	PREVENT & DELOZA D.O.O.	Company	ERDF	Funding prototype, piloting, demonstration and testing	€ 322,781
P14	Manufacturing of aeronautic components in composite material by RTM infusion technology	Spain	dual use	TEDCOM INGENIERIA AERONAUTICA S.L.	Company	ERDF	Advanced manufacturing and Industry 4.0	€3,497,194
P15	AeroSpace Cornwall	UK	dual use	Cornwall Development Company Ltd	Company	ERDF	Developing networks, research and innovation ecosystems	€ 7,133,345
P16	Development of a remote-controlled vehicle for operation in extreme CBRNe conditions (DUV - NRKBE)	Croatia	defence related	DOK-ING d.o.o.	Company	ERDF	Investment in applied R&D	€ 1,178,299
P17	Creation of an international centre of excellence in naval digital systems	France	defence related	NAVAL Group	Company	ERDF	Enabling infrastructure (physical and digital), tools, ranges, platforms, standards	€ 6,062,881
P18	Marine Area Surveillance System using Unmanned Aircraft Systems (UAS) to	Greece	dual use	AS PROTE MARITIME LTD	Company	ERDF	Funding prototype, piloting, demonstration and testing	€ 603,266

	prevent and prevent piracy on merchant ships							
P19	Research and development of a multi-purpose 3D radar prototype for the detection and identification of small-sized aerial and ground targets	Hungary	defence related	PRO PATRIA ELECTRONICS ltd	Company	ERDF	Investment in applied R&D	€ 1,428,785
P20	Cyber Conflict Simulator	Croatia	defence related	Utilis d.o.o.	Company	ERDF	Training and skills	€ 424,418

4.3.2 *Synthesis and comparative analysis of how the good practices have contributed towards regional redevelopment*

In order to illustrate the broad scope in which dual use and defence related projects can contribute towards regional development, the analysed good practices have been grouped into six broad categories.

Those include:

1. Investment in applied R&D
2. Funding prototype, piloting, demonstration and testing
3. Developing networks, research and innovation ecosystems
4. Enabling infrastructure (physical and digital), tools, ranges, platforms, standards
5. Advanced manufacturing and Industry 4.0
6. Training and skills

Below there is further elaboration on the six categories and offer concrete examples of elements of good practice on how the use of ESIF funds for different types/themes through these projects can contribute towards regional development.

1. Investment in applied R&D

These cases illustrate how the use of ESIF in applied research and development with dual use potential can contribute towards regional development.²⁵ In particular, to generate the enabling technologies that underpin development of new products and services. Consequently, the use of ESIF funds for such projects and activities can contribute towards regional development in a number of ways:

- This can be through developing breakthroughs in new markets or sectors by financing the research and development in niche products that have both civil and defence applications,
- Alternatively, pre-existing sectors and markets in particular regions can be reinforced and optimised through further investments in applied R&D.

Showcasing Croatian defence product innovation capabilities and boosting the sector's horizons through improving supply chains and entering new global markets (P17 – ERDF)

This project, developed by the Croatian defence stakeholder DOK-ING, was funded by ERFD and was aligned with the Croatian RIS3 strategy which specifically identifies defence and dual use technologies and products within its scope. It developed a remotely controlled vehicle for acting in extreme chemical, biological, nuclear and explosive conditions with autonomous capabilities enabling various missions to take place. This innovative new product was aimed at showcasing Croatia's security and defence competences in global market as well to help Croatian beneficiaries grow their supply chains and partnerships across Europe. Crucially, these served to open up the potential for technological spin-offs and promote Croatia's long-term aspiration to improve the development and commercialisation of defence and dual use products and services.

²⁵ TRL 5 and below

Achieving market-driven solutions and regional excellence in BCI through establishing research infrastructure to be jointly used by universities, SMEs and industry (P10-ERDF).

This project, developed by defence stakeholder Thales in East Netherlands funded the establishment of an infrastructure at the University of Twente, which was used by the private sector in the region, including SMEs, to conduct empirical studies and test business cases, with the aim of being sustainable and building on this investment. All participating companies carried out work packages related to brain-computer interfaces, such as an algorithm to predict the workload of workers or research to measure multiple people's brain activities in a command-and-control situation, which can be applied to stressful situations of teams in command centres of naval ships. The project Brain Computer Interfaces field lab was mutually beneficial for all stakeholders who pooled skills and assets. The project strengthened the position of East Netherlands in the field of Brain Computer Interfaces, an innovative technology. In addition, the project helped to create a high number of highly skilled jobs and is in alignment with the RIS3 priority in High Tech Systems and Materials.

Researching and developing of a multi-purpose 3D radar prototype in Hungary for the detection and identification of small-sized aerial and ground targets (P19 – ERDF)

This project by the Hungarian defence stakeholder, Pro Patria electronics, developed a multi-beam 3D radar capable of detecting drones from a distance that allows for the necessary protective or countermeasures to be taken. With drones becoming more accessible and relatively cheap, it is essential to develop the ability to detect and counter their potential use against military or civilian targets. The prototype developed – which benefits from innovative technology to detect vertical movements, as well as slow and small objects – can be used both for military and civilian purposes and is able to compete with more expensive, military versions. The project allowed the company to develop technologies with high export potential. It also allowed the lead company, an important player in the Hungarian defence industry, to expand its capacity and hire skilled workforce. It also ensured its competitiveness on the international market.

2. Funding prototypes, piloting, demonstration and testing²⁶

These cases demonstrate how ESIF can be used for projects and activities supporting prototyping, piloting and testing for products as a precursor to commercialisation. This is a critical step in demonstrating the feasibility of a system prior to production; an activity for which it can be difficult to obtain funding. The use of ESIF for such projects and activities can contribute towards regional development through a number of ways;

- Prototyping can enable technological breakthroughs that distinguish a region's innovation potential and lead to further technological spin-offs.
- Piloting and testing can demonstrate the potential and credibility for broader uptake of certain dual use technologies and products to improve regional competitiveness.

Galvanising the competitiveness of the naval security sector in Greece through innovations in the use of UAS that prevent economic losses suffered through piracy (P18 – ERDF)

²⁶ TRL 6 and above

This project, developed by AS PROTE MARITIME, enabled the development of two different technologies to be used in Unmanned Aircraft Systems. The purpose of these developments was to carry out Maritime Area Surveillance in order to prevent piracy on commercial merchant ships. The breakthroughs on sensor-based technologies and ground control systems, which enabled remote operation and surveillance, has served to both develop and distinguish the innovations and effectiveness of Greek companies and research organisations working on the topic of piracy and naval security.

Establishing collaborations between regional UAV researchers and Finnish agricultural and forestry sectors to evolve business models and improving the competitiveness (P3 – ESF)

In the natural-resource rich region of Northern Savonia, this project set out to join the dots between the regional research excellence on UAV technologies with key local business and industry (namely in the forestry and agriculture sectors) which had been in need of innovative ideas and tools to enhance to enhance their competitiveness. Consequently, the local University of Applied Sciences established and facilitated collaborations between business/industry and research and through a number of pilots to encourage sectorial uptake of UAV technologies. These served both to improve regional skills and capacity to embed the use of drones for more effective mapping and facilitate the analysis of land to be used by the forestry and agricultural sectors. As such, this case helped regional businesses/industry foster innovate models and the uptake of new technologies and can also be readily used for military search and rescue operations too.

Developing new market opportunities for Romanian SMEs by supporting activities and innovations in military/protective clothing (P12 – ERDF)

This project, developed by the Romanian defence stakeholder STIMPEX, supports the transfer of technology and innovation uptake by SMEs in areas for smart specialisation, and develop protective clothing for Explosive Ordinance Disposal. This protective clothing is relevant to defence, chemical and oil sectors. The innovations achieve in developing these protective suits using new materials and designs have had a strong spin-off potential which could sow the seeds for a new market breakthrough for Romanian SMEs working within this sector.

Developing new UAS prototypes and relevant technologies, including support for business development (SME) in Estonia (P2 – ERDF)

This project, developed by Estonia defence stakeholder Threed Systems, contributed to the development of a range of new, scalable in-house products (including a mini UAV and mid-wavelength infrared (MWIR) gimbal). It also helped improve the development and production capacity through the introduction of new management systems, production processes and equipment. Through support to the development of the company, the project contributed to the creation of new, high-skilled employment opportunities. Following the project, the beneficiary has announced the expansion of its facilities and more recently the launch of a new UAS division.

Creating potential for spill overs for companies in Slovenia operating in the textile and military domains and strengthening the market position of the company implementing the project (P13 – ERDF)

This project was developed by Slovenian company Prevent & Delosa. It developed a prototype of smart protective clothes with control and alarm function. These smart clothes are relevant for both civilian and defence purposes and offer support for agents working in dangerous environments, including soldiers, police officers or fire-fighters. The project has a strong innovation component that

contributed to creating spill over effects and share knowledge with enterprises active in the textile and military sectors. Additionally, the project helped the project leader strengthen its position in the market and improve competitiveness.

3. Developing networks, research and innovation ecosystems

These cases show how ESIF can be used to enable and develop dual use and defence related networks, research and innovation ecosystems as a means of contributing to regional development. In this regard, ensuring coherence, complementarity and mutual collaboration amongst regional supply chains and research activities is a key for optimising a region's potential and improving competitiveness. Specifically, the use of ESIF funds for such projects and activities can contribute towards regional development in a number of ways:

- Generating investment in new or existing research and competence centres to develop scientific knowledge and highly skilled workers,
- Supporting the establishment of local clusters of organisations to leverage regional competences and boost the connectivity and competitiveness of the region.

Enhancing military and defence research in Bulgaria by promoting mobility from a newly converted military university turned into a contemporary knowledge centre P1 – ESF)

This project, developed by Bulgarian defence stakeholder that is the National Military University, served to realise the objectives of the national Operational Programme on Science and Education for Smart Growth by enabling transformation of the National Military University into a state-of-the-art national contemporary knowledge centre. The new knowledge centre builds on existing research and activities to support military purposes and further expand its scope into civilian topics such as engineering sciences, national security and logistics. The investments have been directed towards human resource capacity, focusing on the expansion of scientific personnel as well as their resources and equipment to carry out their work. Specifically, the project has enabled mobility for participation in international forums for students, PhD candidates and professors. As such, the project has developed scientific capacity and knowledge basis of researchers in an area of Bulgaria which has long been in social and economic decline.

Offering holistic support to Cornish businesses who are developing new products, services and technologies to bring activities to the next level in the space and aerospace sectors (P12 – ERDF)

This project developed by Cornwall Development Company built on the RIS3 strategy (which places emphasis on taking advantage of the region's space and aerospace potential) and has increased the performance and competitiveness of local enterprises, creating highly skilled jobs and launching new products into the marketplace. This was achieved by creating an 'innovation ecosystem' for the space and aerospace clusters by incentivising local businesses to collaborate with other businesses and research institutions to accelerate their innovation potential. Thereby, this project has worked to leverage and catalyse public and private sector investments across the region.

4. Enabling infrastructure (physical and digital), tools, ranges, platforms, standards

The analysed projects falling under this category contribute to explain how ESIF can be used to enable physical and digital infrastructure, tools, ranges, platforms and standards for defence related and dual use projects and activities. Such infrastructure is a key contributor to regional development by providing the enabling capabilities through which to encourage and engender collaboration through common ways of working; provide suitable test facilities for breakthrough technologies; and speed up the commercialisation process. Specifically, the use of ESIF for such projects and activities can contribute towards regional development through a number of ways:

- Developing tools to better facilitate spatial and maritime analysis and management,
- Enhanced capacities of local authorities and companies to make more effective and efficient use of their natural resources and create the conditions for sustainable development in the blue economy, boosting also land-sea economic interactions.

Constructing a new building and developing IT infrastructure to reinforce and expand technological development and high-skilled employment in Cote d’Azur (P17 – ERDF)

This project consisted of the construction of a new building and developing new IT infrastructure for the French defence stakeholder Naval Group within a cluster park focusing on maritime security and sustainable development. The construction serves to enhance group’s research activities in these domains and promote activities within the maritime technological cluster, increasing the added value of research and innovation and unlocking opportunities for growth and technological spin-offs. Moreover, the project has made a significant contribution to creating new high-skilled employment and job opportunities, with more than 1,300 people directly employed as a result of this funding.

Developing Maltese skills and research infrastructure related to spatial data to enable innovations which optimise decisions and foster economic growth (P9 – ERDF/INTERREG)

This project, developed by the Planning Authority of Malta, simplified spatial data management and created a real-time system to make special data more accessible to all government entities. Such special data includes topography, underwater maps and for locational analysis, which can be easily integrated within defence and security systems. In sum, these have enabled more accurate and better decisions by policymakers in a Member State where spatial management is essential due to scarcity of land resources, thus contributing towards better overall economic management and development.

Broadening regional development opportunities by reducing risks posed by historic maritime munitions in the Baltic (P11 – ERDF/INTERREG)

This project, developed by Polish defence stakeholder, the Institute of Oceanology at the Polish Academy of Sciences, has offered strong technological potential for spill overs and has generated more investment opportunities in the area, as the innovative tools created in the framework of the project can be potentially used by several types of public and private entities for various purposes. Moreover, the activities of this project are fully aligned and will provide a solid contribution to local strategies (e.g. Baltic Sea strategy and RIS3) that have clean waters and the treatment of hazardous substances and the sustainable development of the blue economy as main priorities; Finally, the project has managed to bring together a very solid, relevant and comprehensive group of partners, including research institutions, environmental agencies, defence institutions, maritime authorities,

and NGOs from seven EU Member States that cooperated to create multiple transferable tools to address a shared challenge in the Baltic Sea.

Facilitating a multi-stakeholder and cross-border cooperation on the Rhine to develop innovative digital tools to optimise the design of helmets (P4 – ERDF/INTERREG)

This project, developed by the University of Strasbourg, created an innovative digital tool for predicting head/neck lesions and thereby produce prototypes to be used in the design of combat or other purposed helmets. This project showcased effective cross border cooperation between universities, research institutes and local authorities from German and French regions.

5. Advanced manufacturing and Industry 4.0

These cases clearly show how ESIF can be used to promote advanced manufacturing and generate the tools to transition towards Industry 4.0 and integrate new tools and technologies in the manufacturing cycle. Advanced manufacturing can make a major contribution to regional development through more efficient, effective and economical production; through clean, green and flexible manufacturing; and through enabling the production of new and innovative products. Specifically, the use of ESIF for such projects and activities can contribute towards regional development through a number of ways:

- Facilitating investments in advanced technologies in regions which already have strong defence and dual use sectors,
- Further reinforcing supply chains, skills and competitiveness. In particular, through reducing the cost and time of production cycles.

Supporting regional businesses in research and development to boost the innovation of test environments in the aerospace sector of Bremen (P6 – ERDF)

The project was developed by ExxpertSystems and was based on the idea of the ‘Lego brick’ module principle, which allows the assembly of test systems via defined interfaces after plug and play. Compared with existing test environments, this modular principle has several advantageous features. It is easily adaptable to different specimens and testing tasks; it is adaptable over the entire product life cycle; maintenance becomes more cost-effective due to the exchangeability of individual components and test systems can be used over the entire life cycle of a product. The project helped in strengthening the innovation and the position of the aerospace sector in the region of Bremen fully in line with the RIS3 priority in Aeronautics and Space.

Funding a mass production plant for advanced composite materials to anchor and enhance the expertise and skills of SMEs in the Andalusian aeronautical sector (P14 – ERDF)

This project developed by TEDCOM utilised Resin Transfer Moulding technologies and Liquid Resin Infusion to produce advanced aeronautical composite materials, as requested/needed by aerospace giant Airbus, which has some operations in the region. Being fully aligned with the RIS3 Andalusia strategy which identifies dual use technologies and defence as a strategic opportunity in the region, the creation of an innovation hub and the facilitation of research, development and skills in the aeronautics sector served to cement the local supply chains for Airbus aircraft.

6. Training and skills

These cases provide concrete examples on how ESIF can be used to promote training and skills in the defence related and dual use sectors as a means of promoting regional development. Investment in training and skills is a long-standing and well proven way in which ESIF contributes towards strengthening of the socio-economic and innovation potential of regions across Europe, ultimately serving to improve the overall competence of regions and thereby their competitiveness. Specifically, the use of ESIF for such projects and activities can contribute towards regional development through a number of ways:

- Military organisations can help to support and train (young) unemployed people and increase their confidence and competence to enter the labour market,
- Additionally, training can be provided in regions which are lacking specific and advanced technical expertise, to boost the skills assets in specific defence or dual use technologies and bolstering the competitiveness of a region in that field.

Building capacities in cyber security in Abruzzo through innovation and technology development (P8 – ERDF)

The Cyber Trainer project was developed by Italian defence stakeholder Leonardo. It has created a demonstrator that supports the development of realistic, circumscribed and controlled environments (networks, systems and applications) for the training of cyber security managers and operators, both in reference to individuals and work groups. The outcomes of this project contributed to the advancement of expertise in cyber security in a region where cyber security is an essential component in critical economic sectors (e.g. automotive, ICT). Thereby, it has promoted regional development and competitiveness. In turn, this contributes towards increased regional business innovation activity in the field of cyber security.

Improving the infrastructure of Adapted Military Services of Mayotte in order to provide vocational training and skills to young unemployed people (P4 – ERDF/ESF)

This project was developed by French defence stakeholder, the Adapted Military Service in Mayotte, and serves priorities relating to education and training. Specifically, the project provided young people from vulnerable groups with social and professional skills to help them enter the job market. The project involved the construction of a BTP-VRD vocational training centre. By supporting and training between 500-700 young people each year on topics such as metalwork, carpentry, building maintenance and electrical work, the project has served to bolster Mayotte's economic and social status by both filling skills gaps as well as through providing long-term employment.

Promoting interstate and military collaborations to mentor young unemployed people overcome social and economic barriers to the labour market (P7 – ESF)

The Defence Forces Employment Support Scheme, developed by the Irish Ministry of Defence, served to support young unemployed people facing significant social and economic barriers to entering the labour market. Though developing skills, personal motivation and physical fitness, the

project's training sessions seek to promote long-term employment and across Ireland. Led by the Department of Defence but in cooperation with the Defence Forces, the Department of Employment Affairs & Social Protection as well as relevant Education and Training Boards, this project demonstrates effective collaborations between public authorities and military entities to serve social objectives.

Developing a cyber conflict simulator to train incident handlers (executive staff and managers) to deal with cyber-attacks (P20 – ERDF)

This project was developed by Utilis Doo, a Croatian defence stakeholder and SME, to create a Cyber Conflict Simulator (CCS). This is a software which mimics cyber-attacks and provides a realistic environment in which executive level individuals (i.e., incident managers) of different industries can be trained. In this way the CCS allows for hands on practice in dealing with cyber-attacks and similar incidents that complement theoretical knowledge. Potential users of CCS are the financial industry, the ICT sector, energy, transport, public administration, the military sector and others. Indirectly, customers can also be consulting companies that offer a range of security services to clients. The CCS is intended for the global market as it is relevant for any sector where cyber-attacks can occur. Beyond its primary goal of training staff, the CCS can also trigger changes in company/institution processes related to incident management given that it targets executive staff (managerial level).

4.4 Overview on the Regulation package for Cohesion Policy

4.4.1 *The Regulation package for Cohesion Policy in a nutshell*

The European Structural and Investment Funds (ESIF) are funding tools that aim at supporting the economic, social and territorial cohesion of the European Union.

ESIF currently comprises five different streams of funding: the European Regional Development Fund (ERDF), including INTERREG, the European Social Fund (ESF), the Cohesion Fund (CF), the European Agricultural Fund for Rural Development (EAFRD) and the European Maritime and Fisheries Fund (EMFF). ERDF, ESF and CF are related to the Union's Cohesion Policy, while the EAFRD is connected to the Common Agricultural Policy and the EMFF to the Common Fisheries Policy²⁷.

ESIF budget is decided by the European Council and the European Parliament upon a proposal from the European Commission. The principles and priorities of the Cohesion Policy are decided through consultations between the European Commission and EU Member States. Each Member State elaborates a Partnership Agreement outlining its strategy and operational programmes for the funding period. These programmes are managed and implemented by Member States and their regions under the supervision of the Commission²⁸.

The regulatory framework of the Union's Cohesion Policy is established for a programming period of seven years. The current programming period covers the years 2014-2020, and the next programming period, which is currently being discussed, will refer to the period 2021-2027. The

²⁷ https://eur-lex.europa.eu/summary/glossary/structural_cohesion_fund.html?locale=en

²⁸ https://ec.europa.eu/info/funding-tenders/funding-opportunities/funding-programmes/overview-funding-programmes/european-structural-and-investment-funds_en

European Structural Investment Funds for the period 2014-2020 were aligned with the Europe 2020 Strategy, serving as a vehicle to achieve its objective of smart, sustainable and inclusive growth, in addition to other fund-specific missions on economic, social and territorial cohesion. Therefore, the Cohesion Policy for the Union was based on two key goals: investment for growth and jobs and European territorial cooperation²⁹.

The ESIF 2014-2020 were regulated by the **Common Provisions Regulation (Regulation (EU) 1303/2013)**³⁰, in addition to the fund-specific regulations for each funding programme. The CPR sets a Common Strategic Framework for ESI Funds at the European Union level and defines common standards for all the programmes. Article 9 of the CPR states the 11 Thematic Objectives supported by the ESI Funds that shape the determinations of national targets. It is important to recap (in line with S2.1.1 Table 1) that the current 11 Thematic Objectives (TO) (which ought to ultimately achieve Smart, Sustainable and Inclusive Growth³¹) are the following:

Table 3: ESIF Thematic Objectives

Thematic objectives ESIF (particularly ERDF, ESF, CF)
1. Research and innovation
2. Information and Communication Technologies
3. Competitiveness of Small and Medium-Sized Enterprises (SME)
4. Shift to a low-carbon economy
5. Climate change adaptation and risk management and prevention
6. Environmental protection and resource efficiency
7. Sustainable transport and disposal of congestion on major network infrastructure
8. Employment and support for labour mobility
9. Social inclusion and poverty reduction
10. Education, skills and lifelong learning
11. Increased institutional capacity and effectiveness of public administration

These Thematic Objectives are further disaggregated into Investment Priorities (IP), which detail the specific topics and subtopics and contribute to specify the content of each Thematic Objective . These Investment Priorities are defined in the legal regulations of each of the ESIF funds (ERDF, ESF, INTERREG, etc.).

4.4.2 ESIF and Defence

The sections below describe and analyse how ESIF (through ERDF and INTERREG, ESF and the Cohesion Fund) have co-funded relevant defence and dual use activities during the 2014-2020 programming period.

As it was already stated in section 4.2.1.2, the main message to be shared is that the ERDF is the most used ESIF fund. It has supported the highest number of dual use and defence related projects (as identified in the mapping done), representing nearly 83% of them. In addition, the ESF contributed

²⁹ https://ec.europa.eu/regional_policy/sources/docgener/guides/blue_book/blueguide_en.pdf

³⁰ <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32013R1303&from=en>
³¹ "Regulation (EU) No 1303/2013 of the European Parliament and of the Council of 17 December 2013". Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32013R1303&from=EN>

to support 11% of the defence activities identified during the period 2014-2020. ERDF and ESF are then followed by INTERREG (15 projects) and the Cohesion Fund (8 projects), as it is further explained below.

- **European Regional Development Fund³²**

The main aim of the ERDF is to promote economic, social and territorial cohesion by addressing regional disparities within the European Union. Funding priorities occur across the 11 ESIF thematic objectives, with an emphasis on research, ICT, SMEs, environmental protection and infrastructure investment in less developed regions.

Nearly 50% (434) of the projects identified in the context of the present Study that are funded by the ERDF belong to topics related to **innovation, research and technological development**, as well as **knowledge and technology transfer**. These topics are related to thematic objective 1 on “Research and Innovation”, which is the objective out of the 11 that has financed the highest number of defence related and dual use projects under the ERDF. ERDF funding has supported very diverse sectors. The most representative were aeronautics (23% of the identified ERDF projects fall within this category), advanced materials, cyber and network security, and remotely piloted aircrafts.

In parallel, Member states with the largest number of defence and dual use projects financed by ERDF were France (142 projects), Italy (123 projects) and Germany (117 projects), which account for 17.7%, 15.3% and 14.6% of the ERDF supported projects, respectively.

- **European Social Fund³³**

The ESF helps Member States regarding smart, sustainable and inclusive growth, aiming at improving education and employment opportunities in the Union. This Fund supports 19 investment priorities under thematic objectives 8, 9, 10 and 11, with a specific focus on high levels of employment, job quality, more inclusive education, gender equality, equal opportunities and poverty alleviation. The ESF includes the Youth Employment Initiative (YEI) to support Member States with high youth unemployment rates in the integration of young people into the labour market.

Dual use and defence related projects co-financed by the ESF amount to nearly 11% of the identified projects in the Study (107 projects). 46% of ESF defence and dual use projects were funded through TO10 on “Education, skills and lifelong learning”. The TO8 on “Employment and labour market” was another important line of funding for defence in the ESF, representing 40% of the identified ESF projects. As in the case of the ERDF, the ESF supported projects on a wide array of sectors, including advanced materials (25% of the projects), aeronautics (8%) or micro/nano-electronics (8%). 61 projects (58% of the projects funded by ESF) were located in Germany, while 13 projects (12.5%) were located in France.

- **INTERREG³⁴**

European Territorial Cooperation (ETC), also known as INTERREG, is the ESIF strand supported by the ERDF aiming at improving cohesion policies through the transnational exchange of experiences,

³² <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32013R1301&from=en>

³³ <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32013R1304&from=en>

³⁴ <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32013R1299&from=EN>

good practices and joint initiatives among EU 28 regions, Norway and Switzerland. It offers funding for public authorities, agencies, research institutes and clusters working in the areas of research and innovation, SMEs competitiveness, low-carbon economy or natural and cultural heritage. INTERREG is built around three strands of cooperation: cross-border (INTERREG A), transnational (INTERREG B) and interregional cooperation (INTERREG C).

INTERREG is the third most relevant fund for dual use and defence related activities (following the mainstream ERDF and ESF Programmes), and it supported a smaller number of projects compared to the ERDF and ESF mentioned above, totalling 15 projects (1.5% of the overall total). 14 of the INTERREG projects were dual-use, while one of them was defence-related. Environment (TO4 and TO6), ICT (TO2) and innovation, research and technological development (TO1) were the most represented topics. The identified INTERREG projects have their lead beneficiaries located in Belgium (5 projects), France (3 projects), Estonia and Netherlands (2 projects each), and Germany, Poland and Sweden (1 project each).

- **Cohesion Fund³⁵**

The Cohesion Fund (CF) addresses regions where the GNI per capita is less than 90% of the EU average. It focuses on transport networks, infrastructure and sustainable development investments supporting Thematic Objectives 5, 6, 7 and 11. The Connecting Europe Facility (CEF) is a piece of the CF dedicated to transport infrastructure. For the 2014-2020 period, the Cohesion Fund covered Bulgaria, Croatia, Cyprus, the Czech Republic, Estonia, Greece, Hungary, Latvia, Lithuania, Malta, Poland, Portugal, Romania, Slovakia and Slovenia.

8 defence related projects were exclusively funded by the Cohesion Fund, located in Greece, Latvia and Hungary, respectively. These projects focused mainly on construction and renovation of transport infrastructure, energy efficiency and green technologies.

4.4.3 Relationship of the identified projects with Thematic Objectives and Investment Priorities

This section provides an overview of the relation of ESIF Thematic Objectives and Investment Priorities with the identified 972 projects. This exercise sheds some light on how EU's cohesion priorities and objectives have enabled contributions towards defence related and dual use activities. This can be considered a novel exercise, since most of the available databases that have been consulted do not provide information disaggregated at the level of thematic objectives and investment priorities per project. Therefore, what has been developed is based on a systematic thematic analysis that relates project themes to Thematic Objectives and Investment Priorities. Thematic objectives 1-7 are mainly funded through ERDF, while thematic objectives 8-11 are mainly supported by ESF.

For each Thematic Objective, the analysis has been structured in a definition of the content of the objective, its investment priorities, the main sectors covered by the identified defence and dual use projects and a summary box.

³⁵ <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32013R1300&from=EN>

Table 4: Thematic Objectives, projects and main sectors covered

Thematic Objective	Total number of projects	Number of defence projects	Number of dual-use projects	% of total projects	Main sectors covered
TO1: Research, technological development and innovation	530	189	341	65.2%	Aeronautics Advanced materials Cyber and network security
TO3: Competitiveness of SMEs	93	56	37	11.4%	Aeronautics Advanced materials Remotely Piloted Aircrafts
TO10: Education, training, skills and lifelong learning	62	42	20	7.6%	Naval/maritime Micro/nanoelectronics Advanced materials
TO2: Information and communication technologies (ICT)	38	9	29	4.6%	Cyber and network security Location-based technologies Advanced computing
TO4: Low-carbon economy	37	28	9	4.6%	Advanced materials Visualisation and simulation Internet of Things
TO8: Sustainable and quality employment and labour mobility	35	26	9	4.3%	Naval/maritime Military training Advanced materials
TO6: Environmental protection and resource efficiency	12	3	9	1.4%	Naval/maritime Advanced materials Remotely piloted aircrafts
TO5: Climate change adaption and risk prevention	6	5	1	0.7%	Military training Military equipment

Thematic Objective 1 (TO1): Strengthening research, technological development and innovation

Thematic objective 1 addresses research, technological development and innovation projects through two investment priorities. As it was mentioned above, TO1 is the thematic objective that has co-financed the highest number of the identified defence and dual use projects during the 2014-2020 programming period.

a) Investment priorities

Investment priority 1.1 focuses on the enhancement of research and innovation infrastructure and capacities, as well as the promotion of centres of competence. A high number of projects have been

identified that have supported the goal of innovation, research and technological development. 434 projects, which represent nearly a half of the overall number of projects identified, support this theme.

Investment priority 1.2 covers the promotion of business investments in research and innovation, the development of synergies between business and research centres, the transfer of technology or the creation of clusters and open innovation through smart specialisation. Same way as with the first investment priority above, several defence and dual use projects focused on subjects following investment line have been identified. These include knowledge and technology transfer, clustering and economic cooperation and scientific cooperation. 96 projects (11% of the overall total) have supported these topics, 59 of them specifically dedicated to technological transfers.

b) Sectors

Within TO1 co-financed projects cover a wide range of sectors, being probably **aeronautics** and **advanced materials** the most representative. The topic on innovation, research and technological development has been supported by projects related to aeronautics (87 projects), advanced materials (65), cyber and network security (28) and remotely piloted aircrafts (26). Regarding the second investment priority on technology transfer, clusters and cooperation activities, co-funded projects were centred on advanced materials (17), cybersecurity (16) and aeronautics (8).

As a way of example, the operational programme ERDF/ESF Centre-Val de Loire in France funded a project for a cluster on the development and support for the aeronautics industry in the Centre-Val de Loire Region. Similarly, the regional programme for Brittany financed through ERDF supported a project on scientific cooperation for the creation of an international chair in cyber security and vulnerability analysis of military and civilian systems, with the aim of bringing together specialist researchers on security issues.

TO1 has been the “largest funding box” of defence and dual use projects for the programming period 2014-2020. The analysis carried out found four outstanding topics related to this thematic objective: a) innovation, research and technological development, b) scientific cooperation, c) clustering and economic cooperation and d) technology transfer. In addition, a wide variety of sectors benefiting from TO1 were identified, being aeronautics and advanced materials the most represented ones.

Thematic Objective 2 (TO2): Enhancing access to, and use and quality of information and communication technologies (ICT)

Thematic Objective 2 covers issues related to information and communication technologies (ICT) through 3 investment priorities. 38 projects belonging to the theme ICT and digital society have been identified, 4% of the total defence and dual use projects identified in the context of the Study.

a) Investment priorities

Investment priority 2.1 aims at extending broadband deployment and high-speed networks. Our analysis identified 19 projects on the broadband sector as for example, and within the ERDF operational programme in Tuscany, Italy, a project was funded on the design and implementation of a recording system for radio signal that allowed to create a digital software-defined radio. Investment

priority 2.2 deals with the development of ICT products and ICT demands. This investment priority can be a relevant line of funding for the design of ICT technologies related to defence and dual use activities. As an illustration of this type of ICT developments, the ERDF funded a Belgian project for the development of a mechatronic telescopic structure for nano and micro satellites. Finally, investment priority 2.3 targets ICT applications in fields such as e-government, e-learning, e-culture or e-health. An example of ICT technologies applied to the health sector can be found in the Greek project for the creation of a cloud based digital health platform for newly recruited army soldiers.

b) Sectors

Information and communication technologies were applied to very diverse fields. Cyber security, location-based technologies and advanced computing were the sectors that accumulated the greater number of projects. For instance, the ERDF provided funds through this investment priority for a dual use project on the digitalisation of custom procedures in the Port of Bari, which serves as an example of ICT development and cyber and network security. Another dual use project which can serve as an example can be found with the Belgian PASSAnt project, which has developed a tool for complex image analysis to recognize and classify people and vehicles via camera sensors. This project combines advanced computing and ICT to serve the needs of the security sector. In the field of aeronautics and remotely piloted aircrafts, there is a Bulgarian project for the development of a device for distant detection and identification of people from the air, which can be potentially applied to rescue and border policing missions.

TO2 promotes the interrelation between ICT, digital technologies and the defence sector, which can be exemplified through the 38 projects our analysis identified for the 2014-2020 programming period. ICT were applied to diverse sectors, mainly cyber security, location technologies and advanced computing.

Thematic Objective 3 (TO3): Enhancing the competitiveness of SMEs

Thematic objective 3 addresses the needs of small and medium-sized enterprises, which represent more than 99% of businesses in the Union and two thirds of private sector jobs³⁶.

a) Investment priorities

TO3 is divided into four investment priorities, which include the promotion of entrepreneurship and the creation of new firms (IP 4.1), development of new business models for SMEs (IP 4.2), creation and extension of capacities for product and service development (IP 4.3) and support for the innovation and access to regional, national and international markets of SMEs (IP 4.4). The analysis projects which supported this theme did so by focusing on two types of activities: SMEs support (18 projects, 2% of the total) and general business support (81 projects, 9 % of the total), which are both linked to the above-mentioned investment priorities. In particular, while business support is primarily directed to investment priority 4.1, the topic on small and medium-sized enterprises is related to the thematic objective as a whole. Projects supporting SMEs were frequently associated to other funding

³⁶ https://ec.europa.eu/regional_policy/en/policy/themes/sme-competitiveness/

themes, such as clustering and economic cooperation, research and innovation or ICTs applied to SMEs.

b) Sectors

Most of the projects related to the topics on business support and SMEs belonged to the aeronautical sector (18 projects). One concrete example can be found within the Spanish project on the manufacturing of aeronautic components in composite materials by RTM infusion technology. This project established, with the help of ERDF funds, a new production plant for the aeronautics industry in Andalusia. In relation to SMEs, the projects identified cover diverse sectors, including (again) aeronautics, artificial intelligence, biotechnology and cyber and network security. To illustrate this, there is the Hereford Centre for Cyber Security, which aimed at providing ICT services and applications for SMEs and served as a research and business centre for cybernetic technologies.

TO3 can help promote business development and competitiveness of SMEs in defence and dual use activities. In particular, most of the SMEs supported belonged to the aeronautical industry, advanced materials and cyber security.

Thematic Objective 4 (TO4): Supporting the shift towards a low-carbon economy in all sectors

Thematic Objective 4 supports the transition to a low-carbon economy. For the 2014-2020 funding period, the ERDF required Member States to allocated minimum share of their total funding to this thematic objective³⁷.

a) Investment priorities

TO4 is divided into seven different investment priorities. Low carbon economy and energy are two of the identified topics which are linked to the whole thematic objective. These are connected to the promotion of renewable energy sources (IP 4.1), implementation of smart distribution systems operating at low and medium voltage levels (IP 4.4) or the use of low-carbon strategies for all types of territories (IP 4.5). While no defence project addressing low carbon economy were identified, 21 projects (2% of the total) directly related to energy were found.

In addition, our analysis considered other topics related to this thematic objective, such as energy efficiency and green technologies. Energy efficiency is addressed in investments priorities 4.2 and 4.3, which promote energy efficiency in enterprises, public infrastructure and housing sector. A total of 14 projects supported the objectives on energy efficiency, most of them related to the implementation of energy efficiency measures in defence institutions and companies (e.g.: Valpro Ltd. in Latvia or Dunarit Corp. in Germany). Green technologies (3 projects) fall within the investment priority 4.6 scope, which targets the adoption and promotion of R&I in low-carbon technologies. The application of green technologies in the defence sector developed by the Hungarian Military National Security Service with the installation of solar systems on its buildings can serve as a valid example.

b) Sectors

³⁷ https://ec.europa.eu/regional_policy/en/policy/themes/low-carbon-economy/

As explained in the previous section, the analysis carried out did not find any defence or dual use projects related to the promotion of a low carbon economy specifically. Projects on energy, energy efficiency and green technologies were often interrelated and covered a varied range of sectors, including advanced materials (3 projects), health, visualization and simulation, Internet of Things and aeronautics. For example, projects on advanced materials related to the energy field included the development of the production of synthetic alexandrite crystals to meet quality requirements of the aerospace industry (Italy) or the application of newly synthesized 2D nanomaterials for the production of more efficient solar cells (Lithuania).

Regarding TO4, 21 projects have been identified falling in the energy sector, while there are no identified defence or dual use project that directly addressed the promotion of a low carbon economy. In addition, there are projects on energy efficiency and green technologies. These projects were usually interrelated and covered very diverse sectors.

Thematic Objective 5 (TO5): Promoting climate change adaptation, risk prevention and management

Thematic Objective 5 addresses the adaptation to climate change and risk prevention as key aspects of the Union's Cohesion Policy³⁸.

a) Investment priorities

This thematic objective is divided into two investment priorities: investment for adaptation to climate change (IP 5.1) and investment to address specific risks, disaster resilience and disaster management systems (IP 5.2). Even though our analysis did not identify any project supporting the theme of climate change adaptation, there are 6 projects regarding risk prevention and natural disasters.

b) Sectors

6 projects have been identified to support TO5 during this programming period, one in France and five in Greece. POLARISC is a dual use French project funded by the ERDF to develop a platform for improved multi-actor and multi-level management of natural disasters, which includes military activities. The five Greek projects are defence projects funded by the ERDF that aim at increasing the contribution of the Armed Forces in dealing with natural disasters by implementing emergency plans and supplying specialized machinery.

In relation to TO5, our analysis did not observe defence or dual use projects related to climate change, although it observed 6 projects out of the total dealing with natural disasters and risk management.

³⁸ https://ec.europa.eu/regional_policy/en/policy/themes/climate-change/

Thematic Objective 6 (TO6): Preserving and protecting the environment and promoting resource efficiency

Thematic Objective 6 targets the preservation and protection of the environment and the promotion of resource efficiency³⁹.

a) Investment priorities

TO6 is applied through seven investment priorities. The first investment priority (IP 6.1) corresponds to investment in the waste sector and no project on this topic has been identified.

Environment was another theme identified for defence and dual use projects, which corresponds to this thematic objective in general and particularly to IPs 6.2 to 6.7 (e.g.: investment in water sector, conservation of natural and cultural heritage, protection of biodiversity, improvement of urban environment, promotion of innovative technologies to improve environmental protection and resource efficiency, and support of industrial transition and green growth). A total of 12 projects (1% of the total) supporting this theme were identified.

c) Sectors

Regarding the sectors supporting TO6, there are identified projects in the naval sector (3), advanced materials (2), or remotely piloted aircraft (2), among others. Most of these projects were related to IP 6.5 on the promotion of innovative technologies to improve environmental protection and resource efficiency. For example, the DAIMON project (Poland), financed by ERDF-INTERREG, links environmental protection and the maritime sector in the management of dumped chemical and conventional warfare in the Baltic Sea and the Skagerrak. In the advanced materials sector, the Spanish NANOSURF 2016 project examines surface modification techniques by nanotechnology for polymer, metals, wood, textiles and ceramic, in order to improve properties in traditional materials and provide new functionalities. Finally, the SoilTakeCare project (France) aims to develop new strategies for land monitoring, management and soil remediation in contaminated areas through LiDAR scanner and drone photogrammetry.

Regarding TO6, 12 projects related to environmental protection were identified, the majority of them addressing IP 6.5 on innovative technologies for environmental protection and resource efficiency. Most of these defence projects belonged to the naval sector, advanced materials or remotely piloted aircrafts.

Thematic Objective 7 (TO7): Promoting sustainable transport and improving network infrastructures

³⁹ https://ec.europa.eu/regional_policy/en/policy/themes/environment/

Thematic Objective 7 promotes sustainable transport and the improvement of network infrastructures. The Union's Cohesion Policy includes among its priorities smart mobility, multi-modal transport, clean transport and urban mobility⁴⁰.

a) Investment priorities

TO7 is divided into five investment priorities, including: the support of a multimodal Single European Transport Area (IP 7.1); enhancement of regional mobility (IP 7.2); development of environmentally friendly transport systems (IP 7.3); development and rehabilitation of railway systems (IP 7.4); and energy efficiency and security of supply in the development of smart energy distribution, storage and transmission systems (IP 7.5).

b) Sectors

One of the sectors studied by our analysis is transport. However, the projects considered within this particular sector more closely support R&I and technological development (TO1) or SMEs competitiveness (TO3) than to "pure" sustainable transportation and network infrastructure. TO7 does not address the transport sector in general; rather, it provides an approach focused on sustainability and regional mobility that is not considered in most defence and dual use projects. Therefore, no defence or dual use projects seemed to coincide with this thematic objective for the period 2014-2020.

Transport projects considered in our analysis were not directly related to the promotion of sustainable transportation addressed in TO7. Rather, defence and dual use projects in the transport sector were focused on TO1 (research, innovation and technological development) or TO3 (competitiveness of SMEs).

Thematic Objective 8 (TO8): Promoting sustainable and quality employment and supporting labour mobility

Thematic Objective 8 focuses on the promotion of sustainable and quality employment, as well as the support for labour mobility.⁴¹

a) Investment priorities

TO8 comprises seven investment priorities, described in the ESF Regulation, which include: access to employment for job-seekers and inactive people (IP 8.1); integration into the labour market of young people (IP 8.2); self-employment, entrepreneurship and business creation, especially for SMEs (IP 8.3); gender equality in employment and labour market conditions (IP 8.4); adaptation of workers and enterprises to change (IP 8.5); active and healthy ageing (IP 8.7); and modernisation of labour market institutions (IP 8.7). Our analysis identified 42 projects (5% of the total number of projects) supporting

⁴⁰ https://ec.europa.eu/regional_policy/en/policy/themes/transport-energy/

⁴¹ https://ec.europa.eu/regional_policy/en/policy/themes/employment/

the themes of employment and labour market, which are related to this thematic objective and particularly to investment priorities 8.1, 8.2, 8.3 and 8.5.

b) Sectors

Projects addressing employment and labour market conditions were present in different sectors. Most of them were dedicated to the marine and naval sector (12 projects). These 12 projects were located in Germany and consisted mostly on the training of workers in the maritime industry for different job positions and technologies. Another focus of TO8 during this period was military training, where our analysis identified 7 projects located in France. For example, the defence project funded by the ESF for the socio-professional integration of the youth from Guadeloupe. In order to guarantee the reception of the young people most in difficulty, the RSMA-GA recruits about 70% of non-graduates and at least 30% illiterate people. Finally, 11 projects were identified in the sector of advanced materials, 5 in France, 5 in Germany and 1 in the UK. For instance, the dual use project funded by ESF to develop a training programme in Corsica Aeronautical Composites focused on the least qualified employees to improve their skills to work with composite materials. Other sectors include aeronautics (3 projects), cyber security (1), Artificial Intelligence (1) or advanced manufacturing (1).

TO8 is of key relevance for the defence sector. Our analysis observed 42 projects, 5% of the total, referred to employment and labour market. These projects were concentrated in the naval sector, military training and advanced materials. In many cases, these projects were highly related to TO10 on education and training.

Thematic Objective 9 (TO9): Promoting social inclusion, combating poverty and any discrimination

Thematic Objective 9 addresses social inclusion, poverty alleviation and different forms of discrimination through four investment priorities. Our analysis identified just one defence project on the topic of social inclusion, which clearly indicates that TO9 was not a primary line of funding for defence and dual use projects in the 2014-2020 programming period.

Thematic Objective 10 (TO10): Investing in education, training and vocational training for skills and lifelong learning

Thematic Objective 10 promotes the investment in education, vocational training and lifelong learning, in order to ensure long-term competitiveness of the Union and its social cohesion, helping citizens to benefit from the larger job supply⁴². This thematic objective is particularly relevant for the defence sector, since defence companies and institutions usually need qualified labour. Thus, improving education and training in this field would facilitate workers' access to the defence and dual use labour market.

a) Investment priorities

⁴² https://ec.europa.eu/regional_policy/en/policy/themes/education-training/

TO10 is divided by the ESF Regulation into four investment priorities related to the prevention of early school-leaving, improving quality and efficiency of education, enhancing access to lifelong learning and improving the labour market relevance of education. In the topic on education and training, there are 62 defence and dual use projects (7% of the total projects considered) supporting the theme of education and training.

b) Sectors

The two most represented sectors in education and training projects were micro/nanoelectronics and the naval sector (7 projects identified in each sector). In Lithuania, the project “Innovation Grants for Maritime Students” aims to prepare students in the maritime sector for the innovations in the field, improving their position in a highly competitive labour market. The third most important sector was advanced materials (6 projects). For example, the Welsh project “Upskilling for Industry 4 Wales” developed a programme of accredited higher education qualifications to support supply chain manufacturing companies in East Wales dedicated to Industry 4.0. The aeronautical industry and broadband technologies sector had 5 defence and dual use projects each. For instance, the ESF Belgian project 3F (Formations Factories of the Future), which targets the update and strengthening of the Technifutur Skills Centre of Liège and the WAN Competence Centre in Charleroi, dedicated to the field of aeronautics. The cyber security sector presented 4 projects. Also in Lithuania, European Funds supported a project to develop a new study program on cyber security and personal data protection, resulting in highly qualified specialists in the area. Other sectors included remotely piloted aircrafts, big data, advanced computing and robotics.

TO10 is a highly relevant thematic objective for defence and dual use projects. These activities usually require qualified labour, and therefore improving the competences and skills of the workforce is key to ensure their access to a competitive labour market. Education and training was present in 62 projects, which represent 7% of the total defence and dual use projects identified for this programming period.

Thematic Objective 11 (TO11): Enhancing institutional capacity of public authorities and stakeholders and efficient public administration

Thematic Objective 11 aims at enhancing the institutional capacity of public authorities and stakeholders, in addition to achieving an efficient public administration. It targets the investment in infrastructures and human capital to improve the capacities of the public sector⁴³. Our analysis did not observe any defence or dual use projects referred to this thematic objective.

In order to conclude this section, the table below ranks the various Thematic Objectives in accordance to the number of project that have been supported, and also includes the main sectors of activity which the projects refer to.

4.4.4 Looking forward: the 2021-2027 Programming Period

In May 2018 the Commission adopted a proposal for the regulation of the multiannual financial framework for the period 2021-2027, as well as additional proposals on the regulation of the specific funding programmes. These proposals will apply from 1 January 2021 within the new Union of 27 Member States.

⁴³ https://ec.europa.eu/regional_policy/en/policy/themes/better-public-administration/

As for the previous programming period, the Commission has approved a proposal for a Common Provisions Regulation (CPR)⁴⁴ establishing a shared normative structure for the management of European funds. With the purpose of **administrative simplification and reducing normative fragmentation**, the new CPR would jointly operate on seven funds: the ERDF, the ESF+, the Cohesion Fund, the EMFF, the AMIF (Asylum and Migration Fund), the BMVI (Border Management and Visa Instrument) and the ISF (International Security Fund). The total proposed budget of the Cohesion Policy is 330,624 million euros for the period 2021-2027⁴⁵.

One of the most relevant provisions of the CPR proposal is the **simplification of the eleven thematic objectives used in the period 2014-2020 to the five policy objectives (PO) for the period 2021-2027**⁴⁶. Article 4 of the CPR states these 5 new policy objectives:

1. A smarter Europe by promoting innovative and smart economic transformation.
2. A greener, low-carbon Europe by promoting clean and fair energy transition, green and blue investment, the circular economy, climate adaptation and risk prevention and management.
3. A more connected Europe by enhancing mobility and regional ICT connectivity.
4. A more social Europe implementing the European Pillar of Social Rights.
5. A Europe closer to citizens by fostering the sustainable and integrated development of urban, rural and coastal areas through local initiatives.

Another significant change for the new programming period is the **replacement of “ex ante conditionalities” by “enabling conditions”**. Ex ante conditionalities were a key element introduced by ESIF for the 2014-2020 programming period in order to ensure the effective and efficient use of the Cohesion Policy Funds. The new enabling conditions for the period 2021-2027 are fewer, more focused on the goals of the funds and, in contrast to the previous programme, monitored and applied throughout the period. Member States will not be able to declare expenditure related to specific objectives until the enabling condition is fulfilled, ensuring all co-financed operations align with the EU policy framework. Enabling conditions are described in article 11 of the proposal of the CPR and its annexes, which lay down 4 horizontal enabling conditions applicable to all specific objectives, as well as 16 thematic enabling conditions applicable to each funding programme.

Cohesion Policy programmes that can potentially fund defence related and dual use activities are, as in the previous period, the following:

- **ERDF and Cohesion Fund**⁴⁷

The ERDF is centred, as in previous funding periods, on the reduction of regional imbalances in the Union, while the Cohesion Fund continues to address projects on environmental protection and trans-European transport infrastructure. ERDF funding, as in the previous programming period, can be dedicated to any of the 11 policy objectives. The Cohesion Fund is focused on PO2 (greener low-

⁴⁴ https://eur-lex.europa.eu/resource.html?uri=cellar:26b02a36-6376-11e8-ab9c01aa75ed71a1.0003.02/DOC_1&format=PDF

⁴⁵ https://eur-lex.europa.eu/resource.html?uri=cellar:26b02a36-6376-11e8-ab9c01aa75ed71a1.0003.02/DOC_1&format=PDF

⁴⁶ https://ec.europa.eu/commission/sites/beta-political/files/budget-may2018-new-framework-glance_en.pdf

⁴⁷ https://eur-lex.europa.eu/resource.html?uri=cellar:8d2f7140-6375-11e8-ab9c01aa75ed71a1.0001.02/DOC_1&format=PDF

carbon economy) and specific objectives under PO3 (European mobility and regional ICT connectivity).

Article 2 on the specific objectives for the ERDF indicates five specific objectives in which Policy Objective 1 (A more competitive and smarter Europe by promoting innovative and smart economic transformation regional ICT connectivity) is structured:

- Developing and enhancing research and innovation capacities and the uptake of advanced technologies;”
- (ii) reaping the benefits of digitisation for citizens, companies, research organisations and governments public authorities;
- (iii) enhancing sustainable growth and competitiveness of SMEs and job creation in SMEs, including by productive investments;
- (iv) developing skills for smart specialisation, industrial transition and entrepreneurship;
- (v) enhancing digital connectivity.

These themes strongly correspond with the former (2014-2020) TOs 1, 2 and 3. It is recalled that that in the previous period, these TOs were supported by the vast majority of dual use and defence related projects. Consequently, in view of the fact that the scope of action continues along the same lines, as concerns dual use and defence related projects, ERDF will continue enable the dual use and defence sectors to contribute to smart and innovative economic transformation by means of Policy Objective 1 provided that these priorities have been selected by a relevant national/regional smart specialisation strategy.

- **ESF+⁴⁸**

The ESF+ is in charge of the implementation of the European Pillar of Social Rights through the merge of a series of funds and programs, including the European Social Fund (ESF) and Youth Employment Initiative (YEI), the Fund for European Aid to the Most Deprived (FEAD), the Employment and Social Innovation (EaSI) programme and the Health Programme.

The ESF+ will be dedicated to 11 specific objectives under the PO4 for a “more social Europe”, such as facilitating access to employment, new skills or modernising the labour market. Similarly to the ERDF case, the “new” ESF+ supported Operational Programmes will be able to fund defence and dual use projects focused on skill acquisition and labour market, which corresponded to the previous Thematic Objectives 8 and 10.

⁴⁸ https://eur-lex.europa.eu/resource.html?uri=cellar:a39e5630-640f-11e8-ab9c-01aa75ed71a1.0003.02/DOC_1&format=PDF

4.5 Relationship between the regional and national smart specialisation strategies

The following section addresses the link between regional and national smart specialisation strategies and projects identified. The first part focuses on determining the strategies that include references to dual use or defence related activities. The second part analyses the correlation between priorities of the smart specialisation strategies and projects found as result of the mapping exercise. The final part of this section zooms into three territories and examines the extent to which national and regional strategies translate into dual use and defence related projects.

National/regional smart specialisation strategies (RIS3) are integrated, place-based economic transformation agendas that ensure prioritisation of Cohesion Policy Funds via a participative and inclusive entrepreneurial discovery process (involving all quadruple helix partners). It also ensures synergies between policies on different levels (EU, national, regional) and both public and private investments can be increased. The aim is to make innovation-led regional development as a priority for all regions. They align policy support and investments around key national/regional priorities, challenges and needs for knowledge-driven development. RIS3 strategies are based on endowments, the strengths, competitive advantages and potential of each Member State/region. They support both technological and practical innovation and aim to spur private sector investment while increasing engagement among all stakeholders. RIS3 strategies are evidence-based and include robust monitoring and evaluation schemes.

4.5.1 *Dual use and defence related activities in RIS3: an analysis of such references at the regional and national level*

This section contains an analysis, which was made on the Smart Specialisation Strategies for innovation (RIS3) at regional and national level, aiming to identify references to dual use and defence related activities. Five RIS3 were identified as having explicit reference to dual use and defence related activities, based on the information in [Eye@RIS3](#). These were for the scientific domains and the Policy Objectives per S3 priority for every RIS3 in the database. Those are:

- Thessalia/Greece – defence is included as a S3 priority and as scientific domain (13 - Defence, 13.109 – Defence)
- Cantabria/Spain – “Defence and aerospace” is included as a S3 priority
- Croatia - scientific domain (13 - Defence, 13.109 – Defence), policy objective (G - Public health & security, G.47 - Dual use) and S3 priority (On-board systems, communications and defence systems)
- Lazio/Italy - scientific domain (13 - Defence, 13.109 – Defence), policy objective (A - Aeronautics & space, A.05 - Safety & security) and S3 priority (New technologies for the security of citizens and the safeguard of the territory)
- Campania/Italy - policy objective (A - Aeronautics & space, A.05 - Safety & security)

Additional analysis has been carried out based on the scientific domains and the policy objectives. The aim was to identify domains and objectives relevant to defence related and dual use projects which do not explicitly mention ‘defence’ and/or ‘dual use’. The scientific domains and policy objectives analysed are listed in the table below.

Table 5: RIS3

Scientific domains	Policy objectives
03 - Exploration and exploitation of space	A - Aeronautics & space
04.27 - Telecommunication systems	D.18 - Advanced or High performance computing
06.39 - Improving industrial production and technology	D.19 - Artificial intelligence, cognitive systems, augmented and virtual reality, visualisation, simulation, gamification & interaction technologies
06.51 - Manufacture of chemicals and chemical products	D.20 - Big data, data mining, database management
06.53 - Manufacture of rubber and plastic products	D.29 - ICT trust, cyber security & network security
06.57 - Manufacture of computer, electronic and optical products	D.31 - Internet of Things (e.g. connected devices, sensors and actuators networks)
06.58 - Manufacture of electrical equipment	D.35 - Robotics, autonomous and cyber physical systems
06.59 - Manufacture of machinery and equipment n.e.c.	D.36 - Smart system integration
12.102 - Engineering Sciences	D.21 - Broadband, spectrum and other communication networks
12.104 - Mathematics, computer and information sciences	D.24 - Digitising Industry
	D.32 - Location based technologies
	D.23 - Cloud computing and software as a service and service architectures
	G.47 - Dual use
	D.22 - Cleaner environment & efficient energy networks and low energy computing
	E.38 - Advanced materials
	E.39 - Industrial biotechnology
	E.40 - Micro/Nano-electronics
	E.41 - Nanotechnology
	E.42 - Photonics

It was found that 212 RIS3 (out of 217 in total available on Eye@RIS3) contained at least one of those scientific domains or policy objectives. Based on the scientific domains and the policy objectives, almost all RIS3 have at least one priority relevant to defence related or dual use activities. In order to better focus the mapping, and to reflect the fact that some of those domains and objectives could contribute to and be linked with the respective priorities of those 212 civil activities, the RIS3 were further examined to verify their relevance to the defence sector. Consequently, the number of relevant RIS3 was reduced to 148.

4.5.2 *Extent to which RIS3 reflect the number of identified projects*

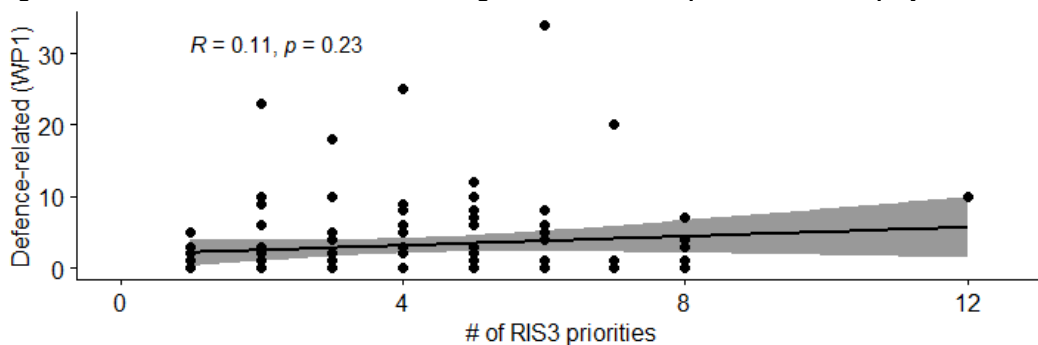
As a next step, we conducted an analysis mirroring the number of regional and national RIS3 priorities and the projects identified under the mapping exercise. The aim of this exercise was to get a better

understanding to what extent relevance to dual use or defence in the RIS3 lead to actual projects funded under ESIF funds.

113 EU regions and member states (first-level NUTS regions) were analysed.⁴⁹ For every NUTS region from the mapping included in the analysis there is at least one RIS3 priority that is linked to dual use/defence. For instance, in Belgium, three RIS3 priorities have been identified for the Brussels-Capital Region, five in the Flemish Region and eight in the Walloon Region. The analysis includes the NUTS region, the number of priorities per NUTS region and the total projects, defence related and dual use projects identified. Further analysis on the relationship between the RIS3 priorities and the projects identified is conducted. Except for the five regions mentioned under 4.5.1 (with explicit references to defence) these RIS3 priorities refer to dual use based on the analysis of policy objectives and scientific domains. Because of the low number of defence related RIS3 priorities, the figures and analysis below refer to all RIS3 priorities that are either dual use or defence related. There are not enough defence related RIS3 priorities to make statistically meaningful statements.

Figure 28 shows that there is a weak positive linear relationship between the number of regional RIS3 priorities and the projects identified. This correlation is statistically highly significant, meaning that the probability the two variables are unrelated is very low.

Figure 28: Correlation between the number of regional/ national RIS3 priorities and total projects identified

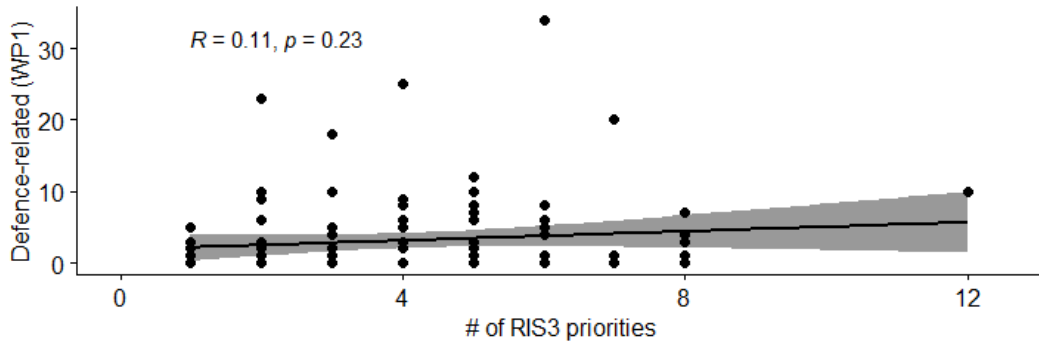


The correlation between the number of priorities in RIS3 and total projects identified is mainly driven by the relation between the number of RIS3 priorities and dual use projects.

Figure 29 below displays the correlation between the number of RIS3 priorities and defence related projects, which shows that the defence related projects are not impacted by RIS3 priorities mostly relevant to dual use, as the relationship is weak and statistically insignificant. Given that there are only five regions with RIS3 strategies explicitly referencing to defence related activities this is in line with the previous analysis. It shows that more defence-related and dual use RIS3 priorities do not necessarily lead to more defence related projects.

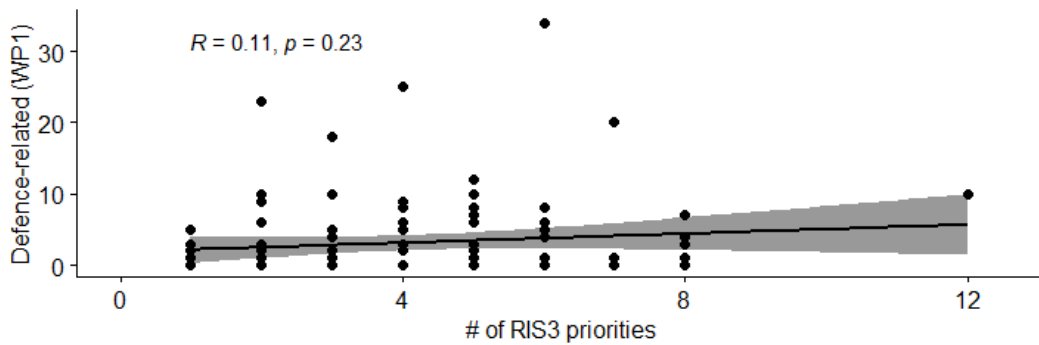
⁴⁹ As a result, for example, the Finnish projects have been omitted as in Finland, the RIS3 strategies are on the regional level and there is no national RIS3 strategy. The Operational Programme which was the basis of the identification of projects is on the national level. This means that regional RIS3 priorities could not be matched with projects on the national level

Figure 29: Correlation between the number of regional/ national RIS3 priorities and defence related projects identified



However, as figure 30 below shows, more dual use RIS3 priorities lead to more dual use projects. The correlation is a weak positive linear relationship but highly significant.⁵⁰

Figure 30: Correlation between the number of regional/ national RIS3 priorities and dual use projects identified



The data points in all three figures show a high variance indicating that examining the RIS3 strategies only quantitatively is not sufficient as the RIS3 priorities linked to defence and dual use led to a significant number of projects.

For example, Croatia has the second highest number of total projects identified despite only having two RIS3 priorities linked to dual use and defence. The region of Campania, Italy that has the most dual use projects identified following the mapping of projects carried out (please see section 4.2) has four RIS3 priorities linked to dual use and defence.

Interestingly, it is the region of Campania, Italy, which amounts for the most dual use RIS3 priorities showing that the **explicit references to defence and dual use in regional strategies do translate into more projects**. In contrast in Saxony-Anhalt, Germany, 8 RIS3 priorities have been identified which transferred into 2 dual use projects and no defence related projects under ESIF funds. The

⁵⁰ Statisticians already speak of high significance if the p-value is below 0.01. The p-value for figure 30 is well below 0.01 meaning that the likelihood that there is no relationship between the number of RIS3 strategies, is very low.

Greek region of Central Makedonia despite having 7 RIS3 priorities linked to dual use did not realize any dual use or defence projects.

In summary, the analysis of the extent to which RIS3 reflects the number of identified projects found that more regional/ national RIS3 priorities relevant to dual use led to more dual-use projects under ESIF funds. Additionally, it was found that the correlation between the number of RIS3 priorities and defence related projects is weak and statistically insignificant.

4.5.3 *Illustrating the relationship between RIS3 and defence related and dual use projects in three territories of the EU*

As described in section 4.5.1 regional and national RIS3 strategies were examined to identify links with dual use and defence related activities to support the analysis. In the following section the relationship between RIS3 strategies and defence related and dual use projects is illustrated based on three case studies that can be found under Annex B. Three territories in the EU, one Member State, Croatia and two regions Campania in Italy and North Rhine-Westphalia in Germany have been selected to zoom into their RIS3 in order to gain deeper insight into how RIS3 strategies and priorities materialised into projects.

Croatia put security as a priority area in the Member State’s RIS3 strategy. The priority covers cyber security, defence dual use, and data mining action programme. Croatia and Campania have been identified as two of five regions with smart specialisation strategies that explicitly refer to defence and/ or dual use. In its smart specialisation strategy, Campania put new technologies and process management for the aerospace industry as a priority area in the region’s RIS3 strategy. Within this area the policy objective of safety and security in aeronautics and space explicitly references dual use/ defence. North Rhine-Westphalia has four RIS3 priority areas linked to dual use in the region’s RIS3 strategy. In addition, North Rhine Westphalia is home to a significant defence industry comprised of SMEs and large industry.

Croatia

The mapping identified 23 defence related projects and 12 dual use projects in Croatia. This is striking because, as shown in chapter 4.2, generally more dual use projects have been identified than defence related projects. On the other hand, this indicates that the RIS3 priority does promote projects within the defence dimension. Two out of 12 dual use projects fit the RIS3 priority Security as they are AI and machine learning projects aimed at developing AI technologies and researching industrial machine learning.

Table 6: List of defence-related projects in Croatia

Project Title	Defence-related or dual-use	Structural fund involved
Development of a remote-controlled vehicle for operation in extreme CBRNe conditions (DUV - NRKBE)	defence-related	ERDF

Development of a multifunctional anti-terrorist system (MAS)	defence-related	ERDF
Internationalization of products for humanitarian demining and firefighting of the company DOK-ING	defence-related	ERDF
Increasing energy efficiency and use of RES in Ericsson Nikola Tesla dd	defence-related	ERDF
Research infrastructure of the Laboratory for Underwater Systems and Technologies (INFRA-LAPOST)	defence-related	ERDF
Advanced Methods and Technologies in Data Science and Cooperative Systems (DATACROSS)	defence-related	ERDF
Construction of the Galeb photovoltaic power plant and replacement of machines in the production plant	defence-related	ERDF
Appearances at foreign fairs to increase the visibility of the company Galko	defence-related	ERDF
Investment in renewable energy sources in the company Hemco doo	defence-related	ERDF
Product certification in the company Hemco doo	defence-related	ERDF
Internationalization of INsig2's business in new international markets	defence-related	ERDF
Strengthening the market position and competitiveness by applying network marketing solutions - INsig2	defence-related	ERDF

The projects are linked to the policy objective D.20 - Big data, data mining, database management, Another one can be linked to the policy objective D.29 - ICT trust, cyber security & network security within the Croatian Security priority as it concerns the overall development of a new platform of advanced microprocessor embedded systems for regulation, protection and control in power systems. One dual use project aimed at expanding high-tech products and services for the satellite and space industries can be linked to the scientific domain 04.27 - Telecommunication systems. 20 out of 23 defence related projects are all linked to the RIS3 priority Security. The projects include projects such as technological projects, projects increasing the competitiveness and internationalisation.

Campania

The mapping identified 8 defence related projects and 17 dual use projects in Campania. This makes Campania the region, in which the most dual use projects have been identified. Compared to the Croatian case study this could be the case as the RIS3 priority is linked to defence but the focus is on aerospace, not on security, which led to 6 dual use aerospace projects in the region of Campania. In this region all 25 projects identified could be linked to the priorities identified as being relevant to defence and/or dual use.

The RIS3 priority identified as being most relevant to defence and dual use is the priority on new technologies and process management for the aerospace industry. 12 dual use projects and 6 defence related projects can be attributed to it. Most dual use projects are software projects or projects with other technological solutions in the aerospace sector of Campania. Most defence related projects identified in the regions relate to advanced technological solutions and developments for aeronautical engines and regional aircrafts.

North Rhine-Westphalia

In contrast to Campania and Croatia, in North Rhine-Westphalia there is no RIS3 priority explicitly linked to defence or dual use. The four identified RIS3 priorities in the region relevant to defence or dual use have been identified based on the scientific domains and policy objectives. Interestingly, in North Rhine-Westphalia 19 out of 25 defence related projects identified have been funded by the ESF, while in Campania and Croatia all identified projects have been funded by ERDF. All the ESF projects in the region relate to either education, training or consulting. None of the ESF projects are associated with any of the RIS3 priority as the focus of the regional RIS3 is on innovation and more oriented towards ERDF.

One defence related project is on the combination of electronically produced micro structured zinc coatings and nano structured zinc oxide top layers is related to the RIS3 priority of new materials and the policy objective E.38 - Advanced materials identified as connected to dual use. Another defence related project on the development of a technology processor for adaptive manufacturing can be matched with the RIS3 priority of Machine and plant engineering. The relevant scientific domain for dual use is 06.39 - Improving industrial production and technology.

Two defence related projects and one dual use project are linked to the RIS3 priority of information and communication technologies. The defence related projects are on innovative and precise code analysis tool that helps to detect security holes in software automatically and a software for autonomous control of robots in the power electronics segment. The dual use project is about a transport satellite for small rockets is being developed here to transport small satellites far beyond the range of the micro launcher. The relevant scientific domains are 12.104 - Mathematics, computer and information sciences and 04.27 - Telecommunication systems and the policy objective linked to dual use is D.35 - Robotics, autonomous and cyber physical systems.

To sum up, the comparison between the three territories shows that explicit reference to defence leads to a lot of defence related projects funded by ERDF as in the case of Croatia. North-Rhine Westphalia had more defence-projects than Croatia, but these were small-scale projects with a low budget funded by ESF with no link to RIS3, innovation or research. Among all regions Croatia is among the regions with the most ERDF-funded defence-related projects. The case of Campania shows that a RIS3 priority more linked to dual use leads to more dual use projects. North Rhine-Westphalia had a similar number of projects as Campania or Croatia. The analysis, however, showed that only a minority was linked to RIS3 priorities as most projects were funded by the ESF and references to defence or dual use were not explicit but identified based on the scientific domains and policy objectives of RIS3 priorities.

5 Conclusions and lessons learnt

This chapter includes the key findings, main conclusions and lessons learnt distilled from the Study and the analysis carried out.

1. **The defence sector has made a significant contribution to regional development over the past programming period through ESIF**

- The European Structural and Investment Funds have supported 972 defence related and dual use projects during the 2014-2020 programming period. The defence sector makes a direct contribution to regional development, through involvement in defence related projects, and provides an exploitation pathway to the commercialisation of dual use projects. The funded projects that have been identified in this study cover a broad range of activities, including technology, facilities, infrastructure, training, internationalisation and exports.
- Projects have involved a range of players in the supply chain: from major multinational firms to micro-SMEs, with 394 (40%) of projects identified involving a defence stakeholder (mostly industry).
- The 1.01 billion euros investment from ESIF leveraged an additional 860 million euros from other sources (including defence industry investment).
- The activities mapped during this study align closely with the policy objectives of the previous and forthcoming ESIF programming period, indicating that the defence sector can play a significant role in enabling the delivery of these policy objectives through accessing ESIF funding.

2. **Both the European Regional Development Fund (ERDF) and the European Social Fund (ESF) have played a role in supporting projects**

- The largest share of ESIF funding support comes from the European Regional Development Fund, which has devoted 814 million euros for co-financing dual use and defence related projects. The European Social Fund has also played a role and has invested 118 million euros to support skills development and employment opportunities in the sector. Finally, European Territorial Cooperation Programmes (INTERREG) have further allocated 33 million euros in cross border and transnational cooperation projects.

3. **What would be the “most common project” as identified in the mapping?**

- Irrespectively of the fact that the inventory of projects identified offers a wide variety of activities and types of projects, looking in detail at the features and characteristics of the 972 ESIF supported projects, the most common project would be one which is: funded by the European Regional Development Fund, has a company (including both SMEs and larger type of companies) as a lead beneficiary, a strong focus on innovation, research and technological development, has a budget of around 100,000 euro and can be considered a “dual use” project.

4. The diverse span of dual use activities funded – and the number of stakeholders involved – reinforces the scope for added value from dual use technologies

- Almost 50% of the projects funded (470) were classified as contributing to innovation, research and technological development, covering a diverse range of technology areas from advanced materials to quantum computing.
- The evidence collected during this study (literature review and key informant interviews) highlight the increasing convergence of defence, security and civil technologies due to both demand and supply-side factors.
- The funding of such technologies through ESIF can have a multiplier effect through a number of factors including: increasing the market size (defence and civil customer base), creating greater supply-side efficiencies (through leveraging R&D investment in different applications) and stimulating innovation (through increased diversity of thought).

5. Dual use projects represent the majority of projects supported (58%), followed fairly closely by projects being considered defence related (42%).

- On average, dual use projects tend to be more closely related to innovation, research and technological developments (such as new technological developments, drones, new laser cutting technologies) than defence related projects. They also have more to do with knowledge and technology transfer. Defence related projects put more focus on business support, employment (both of these themes are related to projects involving the support of defence related companies, contributing to the overall improvement of the sector), energy and construction (infrastructure support) projects. Defence stakeholders involved in defence related projects are to a large extent defence companies, both small and large in size.
- The aeronautics sector accounts for the highest number of projects supported by ESIF, with 20% of projects (including activities related to the production of aircraft components, developing new production technologies, new processes, upgrading of industrial facilities, etc.). Projects relating to advanced materials are the second largest group (with 14% of projects, including new product developments, advanced manufacturing technologies, surface modification, etc.).

6. The cases studied emphasise the complementary competences that defence stakeholders and civil stakeholders often bring to a collaboration

- Many of the identified consortia for defence related projects have both defence stakeholders and non-traditional defence actors from private sector and university sector.
- The case studies provide some qualitative/anecdotal evidence that in these examples, the complementary competences leveraged through the consortium means that the whole is greater than the sum of its parts.

- Development and exploitation of dual use technologies in a defence context will typically also rely on partnerships between defence and civil stakeholders – which is equally true whether the technology originated in the defence sector or in the civil sector.
- The regional focus of ESIF is helpful in this regard in terms of fostering new relationships and generating productive clusters.

7. Macro analysis of the projects identified – and exemplified by the 20 case studies – demonstrate that defence related and dual use activities are delivering a broad range of outputs and outcomes

- Analysis by the Study team grouped the projects into six thematic areas, namely:
 - i. Investment in applied R&D
 - ii. Funding prototypes, piloting, demonstration and testing
 - iii. Developing networks, research and innovation ecosystems
 - iv. Enabling infrastructure (physical and digital), tools, ranges, platforms, standards
 - v. Furthering advanced manufacturing and transition to Industry 4.0
 - vi. Increasing skills through training
- Evidence from the case studies also demonstrates that some projects deliver benefits across two or more of these thematic areas (for example new infrastructure that also forms the central hub for developing a regional network).
- These outputs and outcomes are very well aligned with the Thematic Objectives of the Cohesion Policy for the programming period 2014-2020. It was outside the scope of this study to conduct any form of ex post economic evaluation or impact assessment; however, taken collectively, these activities have the potential to make a significant contribution towards Smart, Sustainable and Inclusive Growth:
 - I. The majority of projects (36%) are creating value for the territory through the generation of innovation in the regions. This means that projects have developed new tools, new ways of doing things, have supported SMEs working in technological sectors thus contributing to the creation of highly qualified jobs, or have contributed to building capacities of workers in highly added value sectors.
 - II. Also, 13% of the identified projects have a clear research and innovation focus, bringing new research techniques and scientific skills to the region at stake, contributing to the development of a new patent in the region or contributing to bridge the gap between research and the actual markets.
 - III. Finally, 14% of projects identified have contributed to the development of competencies and skills, which represents a key factor for fixing the population to a given territory.

8. There is a wide geographical distribution, although Germany, France and Italy account for over half of projects identified

- Examples of projects were found in 27 Member States and the UK (with Cyprus being the exception).
- In general, Member States with significant defence industry (and wider R&D and industrial base) accounted for a greater number of projects than other Member States.
- Five of the top six (by number of projects) are Letter of Intent Member States⁵¹, however, the UK has relatively few projects given its large defence sector (potentially an early impact of the Brexit decision) and it is striking that Sweden (the other Letter of Intent) Member State is in 19th place in terms of number of projects awarded.
- This indicates that there is some awareness of the use of structural funds for defence related and dual use across Member States, although wider communication of the alignment between defence sector objectives and the stated outcomes/priorities of ESIF could increase the contribution made by the defence sector in the next programming period.
- Finally, there are 116 NUTS2 regions (out of 281) where no projects have been identified. These belong to 15 different Member States, with the UK being the Member State with the highest number of regions with no identified projects (30 NUTS2 regions). The analysis carried out does not suggest any pattern (e.g. North vs South, more developed regions versus less developed regions, etc.) explanatory of why some regions do not have any defence related or dual use projects.

9. What do ESIF co-financed projects “actually do”? A wide range of activities can be noted, with the bulk of them being ‘innovate-related’

- In terms of “what the ESIF co-financed projects actually do”, a wide range of activities have been identified, with three of them clearly standing out from the rest. Firstly (nearly a quarter of all identified projects) have concentrated their activities towards the actual “development of tools and instruments or enhancing existing ones” (something which is very much linked to both the main identified themes and sectors). The next category of activities where projects have been active relate to activities that have to do with “transfer of knowledge” (17% of the total). Thirdly, and very much in line with the innovative aspect of many of the projects identified, “skills development and/or enhancement” type of activities including seminars, trainings, capacity building were included in 14% of projects.

10. ESIF wider Thematic Objectives 1 (innovation), 3 (competitiveness) and 10 (skills development) are at the top of the list in terms of funding provided

- In terms of the level and how the various EU's Cohesion Policy Thematic Objectives have contributed to support defence related and dual use projects,, out of the 11 Thematic Objectives supported by ESI Funds, the conclusion comes from the fact that Thematic Objective 1: Research, technological development and innovation has been the “*largest enabler*”, something which is fully coherent due to the highly technical level of the projects

⁵¹ The Letter of Intent (LoI) Framework Agreement Treaty was signed on 27 July 2000 by the defence ministers of France, Germany, Italy, Spain, Sweden and the UK, which collectively represent the substantial majority of the European Defence Technological and Industrial Base (EDTIB). It aimed to create the political and legal framework necessary to facilitate industrial restructuring in order to promote a more competitive and robust EDTIB in the global defence market. See: <http://data.grip.org/documents/200904230933.pdf>

and their innovative component (65% of the total fall within this Thematic Objective 1). The above is especially relevant in the sectors of aeronautics, advanced materials, and cyber and network security. Following Thematic Objective 1 as the “key enabler”, Thematic Objective 3 focusing on the competitiveness of SMEs and the business community can be found (11% of projects). Thirdly, Thematic Objective 10 on education, training, skills and lifelong learning, covering the naval/maritime sectors, micro and nanoelectronics and advanced materials has proved to be widely targeted by defence related and dual use projects funded by ESIF.

- European Territorial Cooperation (INTERREG) type of projects, although perhaps more modest numbers, have also proved that transnational cooperation has played a relevant role in the contribution of the defence sector to regional development.

11. Our analysis suggests that defence related and dual use activities can make an important contribution to the next programming period (2021-2027)

- In terms of the 2021-2027 new round of programmes, it is concluded that there is strong potential for tapping into these funds for the purpose of defence related and dual use projects and activities. The main reason for this is the existence of Policy Objective 1A (Smarter Europe), and the specific focus of ERDF 2021-2027, which very much resembles with the 2014-2020 Thematic Objective 1 (research, technological development and innovation), that was by far the largest supported thematic objective by defence and dual use projects. Thus, this alignment in some of the ERDF policy priorities in between both programming periods indicate that there will be a similar (if not stronger) scope for funding dual use and defence related projects.
- Furthermore, under 2021-2027 ESF+, it has been concluded that so long as defence and dual use projects and activities contribute towards skills development and access to the labour market - as many did under TO8 & 10 of the previous MFF - there is good scope for accessing finance under the new Policy Objective 4 (A More Social Europe).

12. Correlation between Regional Smart Specialisation Strategies and the identified projects: explicit reference to defence and dual use in regional strategies translate into more defence related and dual use projects.

- The analysis of references in regional and national RIS3 strategies to dual use and defence related activities identified only five regions with explicit references to such activities. More references for the other regional and national RIS3 strategies have been found through the scientific domains and policy objectives of the priority areas regions and Member States have outlined for their smart specialisation strategies.
- Regarding dual use and defence related activities in regional and national smart specialisation strategies, the analysis found a correlation between the number of RIS3 priorities and dual use activities but no correlation between defence related activities and the priorities of regional and national smart specialisation strategies, which are mostly relevant to dual use and for the most part do not explicitly refer to defence. There are not

enough defence related RIS3 priorities to establish a statistically meaningful correlation between defence related priorities and defence related activities. The quantitative analysis found that more RIS3 priorities are associated with more dual use activities. Furthermore, it was found that explicit references to defence and dual use in regional strategies translate into more defence related and dual use projects.

Annex A – Project fiches

Project fiche 1 – Support for the development of human resources and capacity for science and research of the National Military University	
Basic information	
Project title	Support for the development of human resources and capacity for science and research of the National Military University for its transformation into a contemporary knowledge centre
Member State	Bulgaria
Fund	ESF
Total project amount	€ 404,711
EU co-financing rate	85% (€ 344,004 from ESF)
Contribution to Thematic Objective	TO 1 “Strengthening research, technological development and innovation” and TO 10 “Investing in education, training and vocational training for skills and lifelong learning”
Lead partner(s)	
Lead partner	‘Vasil Levski’ National Military University
Legal identity of promoter / lead partner	University
Other partner(s)	-
Final beneficiary(ies)	Students / researchers / lecturers at the university
Activity	
Project theme	Education and training
Project overview	The project was implemented in the period 2017-2019. It supported the development of human resources engaged in the research activities of the National Military University (NMU). The overall objective of the project was to transform the military university into a contemporary scientific organisation with a substantial contribution to the knowledge-based economy. Hence, the key activity of the project was the development of scientific capacity and the increased motivation of the young researchers. The main target group of the project included students, doctor degree students, post-doctoral fellows, young scientists, and lecturers from the university.
Range of activities	The project activities included measures aiming: <ul style="list-style-type: none"> - to increase qualification; - to continue the career advancement of young scientists; - to contribute to the development of specialised scientific networks amongst Bulgarian and foreign scientists; - increased participation in international academic forums; - publications at internationally ranked journals; - to provide access to scientific laboratories, experimental equipment, and databases to conduct innovative research and development; - dissemination of scientific results.

Project fiche 1 – Support for the development of human resources and capacity for science and research of the National Military University													
Extent to which project is dual use or defence related	The project is defence related as it was implemented by a defence stakeholder – the “Vasil Levski” National Military University (NMU). The university was established with an Act of the National Assembly on 14.06.2002. The university is state-owned, and it has its headquarters in Veliko Turnovo.												
About the call	The objective of the call for proposals (“Support for development of doctoral students, post-doctoral researchers, graduate students and young researchers - PHASE 1” under Operational Programme “Science and Education for Smart Growth”) was broad: development of the human resources involved in the area of science. The project call was not designed to invite project applications with a specific focus on defence related and/or dual use activities. However, the broad focus on researchers, allowed the NMU to submit a proposal with consideration for the following types of activities, which were eligible under the call for proposals: mobility, promotion of science, qualification increase, development of partner networks, and training.												
Alignment with good practice criteria													
ESIF good practice features	<p>There are several features, which make this project stand out as a good practice:</p> <ul style="list-style-type: none"> - It was implemented by a military stakeholder (a military university), but it focused on research, which also has civilian use (in the area of logistics; technical sciences, including IT automation, laser technology); - In this case, the ESF financing was used to make the NMU an attractive place for research, by positioning it not just as a military university, but also as a research institution; - The project supported a military university outside the capital, in a region of economic and demographic decline; - The focus of the project on engineering aimed to contribute to the withdrawal of young researchers from this field and at the same time linked it to national security and logistics. 												
Project Outputs	<p>The project delivered the planned outputs and for two out of the three outputs, the target values were surpassed:</p> <table border="1"> <thead> <tr> <th>Indicator</th> <th>Target</th> <th>Achieved</th> </tr> </thead> <tbody> <tr> <td>Teachers in higher education institutions involved in advanced training programs</td> <td>42</td> <td>42</td> </tr> <tr> <td>Young scientists up to 34 years of age, inclusive, who received support under the OP for activities in the field of R&D</td> <td>14</td> <td>34</td> </tr> <tr> <td>Students involved in mobility programs</td> <td>11</td> <td>14</td> </tr> </tbody> </table>	Indicator	Target	Achieved	Teachers in higher education institutions involved in advanced training programs	42	42	Young scientists up to 34 years of age, inclusive, who received support under the OP for activities in the field of R&D	14	34	Students involved in mobility programs	11	14
Indicator	Target	Achieved											
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Young scientists up to 34 years of age, inclusive, who received support under the OP for activities in the field of R&D	14	34											
Students involved in mobility programs	11	14											
Project results	Building upon the delivered outputs, the project achieved its overall objective of supporting the transformation of the military university into a more modern scientific organisation. What makes it a good practice is the combination of improving both defence related and civilian research capacities. The support for lecturers, researchers, and students led to increased motivation and overall scientific capacity of the university. Furthermore, its focus on young researchers is an investment in future research. In particular, the project aimed to support the												

Project fiche 1 – Support for the development of human resources and capacity for science and research of the National Military University	
	career advancement and research of PhD students. The long-term impacts of the project cannot yet be determined as it was finished at the end of 2019.
Contribution to economic development	The project included activities raising the awareness of young researchers on the possibilities to perform research in the fields of engineering science, national security, and logistics. The inclusion of this activity is justified by the presence of a lasting negative trend for the withdrawal of young people from academic careers and from the engineering profession, which is considered as one of the main reasons for the low innovation capacity of Bulgaria. Even though the project itself cannot reverse the withdrawal of young people from engineering disciplines, it makes a strong contribution to increasing the Research and Development capacity in this field. Thus, even though the beneficiary of the project was a military university, it clearly aimed at contributing to the economic development of the Member State.
Contribution to social development	The social impact of the project rests on the following: <ul style="list-style-type: none"> - the mobility activities allowed researchers / students / lecturers at the military university to exchange experience with their peers from other Member States like Romania and Latvia; - the project activities led to the increased qualification of PhD students, young researchers and lecturers, which improved their career development perspectives; - activities related to increased motivation and retention of young researchers (including through a PhD students virtual resource centre, improvement of the internal rules on PhD students).
Contribution to environmental development	The project did not have any focus on the protection of the environment.
Innovation and potential for technological spin-offs	The project activities included three training modules in the field of computer and engineering technologies for design, with an additional choice among the following modules: "Statistical data processing through modern software products", "Practical course in the field of technology and knowledge transfer", Specialized course on modern software products in the field of engineering design - (SATIA V 5)". By increasing the qualification of the research staff, the project played a role in improving the capacity of the higher education institution to practically integrate the link between education - science - businesses, as well as to increase the motivation of researchers. Furthermore, the project included an activity for the provision of access to scientific facilities, databases, and information for conducting scientific research by teams of the NMU formed by post-doctoral students, doctoral students (including young scientists) and lecturers. The aim of the activity was to provide modern conditions for experimental activity, thus increasing the motivation for careers in research and development at the university. The performed research was in the fields of military history and the protection of the population from disasters and large-scale accidents.
Contribution to EU objectives	As mentioned, the project contributes to two thematic objectives at the same time: TO 1 "Strengthening research, technological development and innovation" and TO 10 "Investing in education, training and vocational training for skills and lifelong learning". The building of a knowledge-based economy is a relevant long-term goal of the EU, including the priorities in the Europe 2020 strategy. It was also a response to the EC recommendation that the Member States need to focus on research and development policy and innovation.

Project fiche 1 – Support for the development of human resources and capacity for science and research of the National Military University

Transferability	<p>The potential for transferability of the project lies in the effective use of the ESF by a military university in the pursuit of several objectives:</p> <ul style="list-style-type: none"> - advancement of the military and civilian research at the same time; - increase in the qualifications of university staff / researchers / students; - improvement of PhD courses; - exchange of experience with peer institutions and improvement of the international exposure of the military university via participation in international forums and support for publications in scientific journals. <p>Even though the call for proposals did not target military institutions, the broad eligibility rules allowed also support for research in a military university, which could also be financed in future operational programmes.</p>
Additional information / sources	<p>Sources:</p> <ul style="list-style-type: none"> - <i>Project website (link)</i> - <i>EU funds management information system (link)</i> - <i>Interview (questionnaire) with the Ministry of Education and Science (MA)</i>

Project fiche 2 – Threod Systems development programme 2017	
Basic information	
Project title	Threod Systems development programme 2017
Member State	Estonia
Fund	ERDF
Total project amount	€ 1 080 918
EU co-financing rate	45% (€ 486 413)
Contribution to Thematic Objective	TO 1 'Strengthening research, technological development and innovation'
Lead partner(s)	
Lead partner	Threod Systems
Legal identity of promoter / lead partner	Company
Other partner(s)	-
Final beneficiary(ies)	Threod Systems
Activity	
Project theme	Innovation, Research and technological development
Project overview	The project funded supported Threod systems, a company specialising in the development and production of Unmanned Aircraft Systems (UAS), as well as C4I solutions. The funding contributed to the development of a range of new, scalable in-house products. It also helped improve the development and production capacity through the introduction of new management systems, production processes and equipment.
Range of activities	<ul style="list-style-type: none"> - Development of new products - Introduction of new management systems and system equipment, as well as training sessions associated with them
Extent to which project is dual use or defence related	This is a defence related project. The lead partner, Threod systems is part of the Estonian Defence and Security Industry Innovation Cluster and the Estonian Defence Industry Association.
About the call	The project received funding under the 'Operational Programme for Cohesion Policy Funds 2014-2020'.
ESIF good practice features	<p>The good practice features of the project are:</p> <ul style="list-style-type: none"> - The project contributes to the second priority ('research and development') of the 'Estonian Research and Development and Innovation Strategy 2014-2020'. - It includes the development of new products, strengthening the export potential of the company benefitting from the funding.
Project Outputs	<p>The new products developed are:</p> <ul style="list-style-type: none"> - Mid-wavelength infrared (MWIR) gimbal - Vertical take-off and landing (VTOL) EOS - 3x autopilot - Stream C VTOL <p>In addition, training sessions were held for employees to support the company's ability to enter export markets.</p>

Project fiche 2 – Threod Systems development programme 2017	
Project results	The project was successful in the development of new products. The products have been showcased in several trade fairs .
Contribution to economic development	Through support to the development of the company, the project contributed to the creation of new, high-skilled employment opportunities in the company benefitting from the support. Threod has announced the expansion of its facilities in 2019 and more recently the launch of a new UAS division .
Contribution to social development	The project had no social development goals.
Contribution to environmental development	The project had no environmental development goals.
Innovation and potential for technological spin-offs	The new products developed through the programme unlock further potential for innovation in the field of UAS.
Contribution to EU objectives	The project contributes to the 'Research and Development' and 'Employment' goals of the Europe 2020 strategy.
Transferability	The project is easily transferable. However, it requires the presence of a defence stakeholder capable of developing products that are competitive on the international market.
Additional information / sources	<p>Sources:</p> <ul style="list-style-type: none"> - <i>Threod company website</i> (link) - <i>Estonian Defence and Security Industry Innovation Cluster website</i> (link) - <i>Supported projects description</i> (link) - <i>Estonian Research and Development and Innovation Strategy 2014-2020 "Knowledge-based Estonia"</i> (link) - <i>Threod website, news</i> (link) - <i>Threod Systems Launches New UAS Divisions</i> (link)

Project fiche 3 – Drone on the fly!	
Basic information	
Project title	Drone on the fly!
Member State	Finland
Fund	ESF
Total project amount	€ 99,000
EU co-financing rate	€ 33,465 (33.8%)
Contribution to Thematic Objective	TO 10 "Investing in education, training and vocational training for skills and lifelong learning"
Lead partner(s)	
Lead partner	Savonia-ammattikorkeakoulu oy (Savonia University of Applied Sciences)
Legal identity of promoter / lead partner	University of applied sciences
Other partner(s)	
Final beneficiary(ies)	Savonia-ammattikorkeakoulu oy (Savonia University of Applied Sciences)
Activity	
Project theme	Research and technological development
Project overview	<p>Drone on the Fly! (2018-2019) was based in the Northern Savonia region of Eastern Finland, a relatively underdeveloped and underpopulated region in the Member State. To maintain the global competitiveness of the forestry and agriculture sectors, the region needed to utilise new technologies and know-how.</p> <p>Drones can capture and analyse various types of data concerning territories which can be of significant use a range of sectors including forestry; agriculture; fire and rescue; and maintenance of critical infrastructure.</p> <p>Consequently, this project sought to create a bridge between research and business practices as well as business restructuring based on the potential for uptake and utilisation of UAV technologies. Coordinated by the Savonia University of Applied Sciences, it did so by enabling and facilitating networking and cooperation in the region between universities, research institutes, associations and companies.</p>
Range of activities	<p>The project engaged in three types of activities:</p> <ul style="list-style-type: none"> – First, physical meetings such as seminars, workshops and networking sessions were organised to enable stakeholders to learn and share information and experiences. – Second, existing research and information on the use of different UAV technologies for various purposes and sectors were identified and consolidated into a number of guidance documents. – Third, new research was carried out in terms of pilot studies concerning the use of drones in four different sectors (see project outputs below).
Extent to which project is dual use or defence related	The primary objectives concern civilian purposes (i.e. business and sectoral innovation) and therefore is a dual use project.
About the call	The project "Drone on the fly!" belongs to the policy axis 4 (Education, professional skills and lifelong learning) and the specific objective on "Improving the availability quality of education

Project fiche 3 – Drone on the fly!	
	in growth sectors and sectors affected by structural change". This line of action aims to improve the skills of the working and unemployed population, develop flexible learning paths to meet the rapidly changing skills requirements, strengthen cooperation among educational institutions and working life and support smart specialisation regional strategies based on the strengthening of education and skills.
ESIF good practice features	<p>This project is considered as a good practice namely name due to:</p> <ul style="list-style-type: none"> – the innovation involved through establishing new processes and business models (i.e. those that involved UAV technologies) for sectors such as forestry and agriculture, thereby opening up new economic growth potential in the region. – the project has contributed towards enhancing the skills and capabilities of the local workforce, through training local companies and sectors to better utilise UAV technologies. – the project also contributes in various ways towards promoting environmental protection (as elaborated below).
Project outputs	<ol style="list-style-type: none"> 1. Seminars and workshops focus on explaining the practicalities and the sectoral advantages of using drones and integrating them into business models. 2. A document of different possibilities in industries for the use of drones was produced. 3. Four pilot studies were carried out concerning the use of drones. These concerned <ol style="list-style-type: none"> a) Drones in agriculture b) Sound measuring in electricity networks c) Ultrasound measuring with drones d) Snow depth on building roofs 4. Document on sensor integration for drones was produced 5. Document on drone & sensor data collecting and saving it to cloud services was produced (in Finnish)
Project results and impact	<p>Overall, the main results of the project are that the participants' skills have increased in the use of UAVs and that new applications for UAVs have been found (particularly in the forestry and agricultural sectors). In other words, the improved know-how of stakeholders has been achieved and technological innovations have also been achieved through the extension of the usage of UAVs to new sectors.</p> <p>In terms of economic impact, the project has set the foundations for growth and employment in the forestry and agricultural sectors of the economy by making their products and activities more price competitive (i.e. lowering costs).</p> <p>In terms of social impact, the project has helped associations and companies re-skill workers to become more efficient in their land surveying activities.</p> <p>In terms of environmental impact, many indirect benefits have been/can be reaped by to better use natural resources, improve the usage of renewables as well as enhancing environmental expertise and understanding of the region.</p>

Project fiche 3 – Drone on the fly!	
Contribution to economic development	<p>The project laid the foundation for growth and employment in the region, by improving technological know-how and improving skills concerning UAV technologies and its application in various sectors (namely forestry and agriculture). The initiation and facilitation of structural change in these sectors has made such regional activities more internationally competitive.</p> <p>To elaborate, in Finland, labour costs are higher than much of Europe. Thereby, activities such as surveying large amounts of land, forests and (potential) farms through a manual/physical worker is often costly, increasing the overall costs of the final products (e.g. paper, livestock). Furthermore, different types of surveyors are required to acquire different kinds of information. By re-skilling and training the associations and companies to utilise UAV technologies, these companies can comprehensively image, map, survey and analyse vast amounts of (remote) areas for a fraction of the price of employing physical surveyors.</p>
Contribution to social development	Re-skilling process whereby associations and companies have re-skilled some workers to promote the usage of UAV technologies rather than carrying out physical surveys of lands.
Contribution to environmental development	Numerous positive impacts to environmental development can be noted from this project; however, it must be stated from the outset that these were not the main objectives nor the most significant impact of the project. Instead they represent an indirect and mostly 'potential' impact to regional environmental development.
Innovation and potential for technological spin-offs	<p>The pilot projects carried out during the project focus on the natural resources and forestry sectors undergoing restructuring, in which it is possible to find completely new innovations and commercially viable operating models for the use of UAV equipment.</p> <p>However, more generally regarding innovativeness, this project was mainly about consolidating existing technologies and know-how rather than developing new innovative technologies.</p>
Contribution to EU objectives	This project also contributes towards EU sustainability goals concerning the Green Deal through promoting sustainable land management techniques.
Transferability	<p>This project could very easily be replicated. The critical factor for this would be to coordinate the identification and gathering interested regional stakeholders. This would stress the benefits of networks, good practices and use existing knowledge and replicate the processes and outputs of this project but in local/regional languages and contexts.</p> <p>Crucially it also necessary to explain to all parties how mutually beneficial participation will be.</p> <p>Finally, these projects do not cost very high amounts of funding (100k); thus replicating them is not a highly resource-intensive.</p>
Additional information / sources	<p>Sources:</p> <ul style="list-style-type: none"> - Interview with project coordinator - Questionnaire filled out by Managing Authority - Structural Funds Information Service. ERDF and ESF Projects in Finland during the 2014–2020 Programme Period (link) - Structural Funds Finland (link) - Savonia University RDI Projects (link)

Project fiche 4 – HNBI - Biomechanics of the cranio-encephalic and cervical system	
Basic information	
Project title	HNBI - Biomechanics of the cranio-encephalic and cervical system
Member State	France
Fund	ERDF (INTERREG)
Total project amount	€ 935,819
EU co-financing rate	50% (€ 467,909.50)
Contribution to Thematic Objective	TO 1 "Strengthening research, technological development and innovation"
Lead partner(s)	
Lead partner	University of Strasbourg
Legal identity of promoter / lead partner	University
Other partner(s)	Partners of the project are mainly universities, research institutes, and regions: <ul style="list-style-type: none"> - Institut Franco-Allemand De Recherches De Saint-Louis - Hochschule Furtwangen - Universitätsklinikum Freiburg - Land Rheinland-Pfalz - Land Baden-Württemberg - Région Grand Est
Final beneficiary(ies)	Entities specialised in the design of (motorcycle, bicycle, riding, and combat) helmets and also legal medicine entities.
Activity	
Project theme	Health
Project overview	The key objective of the HNBI project is to create a digital tool for predicting head/neck lesions based on a specific model, the so-called finite element model (FEM). The project involved several tests that were carried out using different methods to develop new safety standards. Test results were used to incorporate new solutions and produce prototypes to be used in the design of motorcycle, bike, riding, and combat helmets.
Range of activities	The project includes a wide range of research and applied activities. Research activities are: <ul style="list-style-type: none"> - Accidents analysis to get relevant information, data and statistics; - Theoretical analysis of accident simulations; - Definition and criteria to assess head injuries; - Definition and criteria to assess neck injuries; Applied activities: <ul style="list-style-type: none"> - Applied simulation of car accidents; - Applied simulation of motorcycle and bicycle accidents;

Project fiche 4 – HNBi - Biomechanics of the cranio-encephalic and cervical system	
	<ul style="list-style-type: none"> - Applied simulation of accidents in the horse riding domain; - Applied simulation of accidents in the military domain; - Development of a mechanical and forensic medicine platform
Extent to which project is dual use or defence related	HNBi - Biomechanics of the cranio-encephalic and the cervical system is a dual use project. The project's key outputs are new solutions and prototypes that will be used to develop various types of helmets used for both civil and defence related purposes, including motorbikes, bikes, horse-riding and the military domain. In addition, project partners do not include any defence related stakeholders.
About the call	The project was selected in a call launched in 2016 as part of an initiative called "Offensive Science." The call wasn't explicitly designed for defence or dual use projects. It aimed to finance scientific excellence projects in the Upper Rhine region in the field of renewable energies and rational use of resources, sustainable mobility and vehicle construction, information and communication technologies, health and medical technologies.
ESIF good practice features	
ESIF good practice features	<p>Several elements make the project a good practice:</p> <ul style="list-style-type: none"> - The project produced a digital tool which allows for better prediction of head/neck lesions and will contribute to improving the efficiency of helmets used for civil and also defence related purposes; - HNBi is an INTERREG project, and it is the result of the positive cooperation of a strong network of universities, research institutes and local authorities from German and French regions; - The bioforem platform that is one of the project outputs is an innovative multi-disciplinary collaboration platform which makes use of innovative methods and models to predict head/neck lesions. This can also be used as a support in accidents, assaults and child abuse investigations.
Project outputs	The project's key output is the digital tool that provides a simulation of head and neck lesions. This is a crucial element for incorporating new solutions and develop innovative prototypes for designing helmets. The simulations can also be used to understand injury mechanisms in legal medicine. In this respect, another output of the project is a medical-mechanical collaboration platform that helps apply advanced methods to elucidate accidents, abuses and assaults.
Project results	The project's key result is the development of new and efficient methods that can contribute to improving the design and security characteristic of helmets adopted in several fields such as car, motorbike, horse riding, military. The methods developed will also be implemented in legal medicine and contribute to supporting accidents and assaults investigations.
Contribution to economic development	The project is a research project; it did not have any effects on the economic development of the regions.
Contribution to social development	The project did not include any specific social goal. However, it was carried out by the consortium in close collaboration with companies. Once companies implement the new methods introduced by HNBi, it will potentially have a positive impact on the local communities, contributing to the development of new skills and attracting high-skilled labour force.
Contribution to environmental development	The project did not include any specific environmental goal.

Project fiche 4 – HNB <i>i</i> - Biomechanics of the cranio-encephalic and cervical system	
Innovation and potential for technological spin-offs	The innovation is a critical element of the HNB <i>i</i> project. It introduced innovative methods and tools that can be used to predict head and neck injuries in several domains. Companies' involvement in the project implementation, even if they don't figure as partners, contributed to the promotion of knowledge and technology transfer and the creation of spill-overs.
Contribution to EU objectives	The project contributes to Europe 2020 objectives, in particular, "Increasing combined public and private investment in R&D".
Transferability	The project can be easily replicated in other territories. The key enabling condition for the project's replicability is the presence of a network, including universities and other entities (e.g. businesses) already specialised in the topic.
Additional information / sources	<p>Sources:</p> <ul style="list-style-type: none"> – <i>Project website</i> (link) – <i>Programme website</i> (link) – <i>Keep</i> (link) – <i>Interview (questionnaire) with the Managing Authority</i>

Project fiche 5 – Construction of a Professional Training Division with the Adapted Military Service In Mayotte, RSMA-M

Basic information	
Project title	Construction of a Professional Training Division with the Adapted Military Service in Mayotte, RSMA-M
Member State	France
Fund	ERDF/ESF
Total project amount	€ 5,710,242
EU co-financing rate	64% (€ 3,671,685)
Contribution to Thematic Objective	TO 9 "Promoting social inclusion, combating poverty and any discrimination"
Lead partner(s)	
Lead partner	Préfecture of Mayotte
Legal identity of promoter / lead partner	Local government
Other partner(s)	-
Final beneficiary(ies)	Adapted Military Service In Mayotte, RSMA-M
Activity	
Project theme	Construction and renovation; Education and training
Project overview	<p>The project supports the vocational training of hundreds of young people each year in the French overseas department of Mayotte. The programme focuses on people from disadvantaged backgrounds, often with low levels of education and difficulties with entering the labour market.</p> <p>The general programme, run by the SMA (Service Militaire Adapté – adapted military service) has been in place for several decades in French overseas territories and was introduced to Mayotte in 1988. It aims to help tackle social issues in these territories with large young populations, high illiteracy rates and where many leave education without graduating.</p>
Range of activities	The RSMA programme provides vocational training in a range of professions, as well as support to acquire a driving licence. Under the current programming period, the ESIF-funded project included the construction of a new facility to allow for an increase in the number of participants and for the improvement of the training offered.
Extent to which project is dual use or defence related	This is a defence related project. The beneficiary is a special army regiment. As the army manages the programme, the structure of the division follows military practice.
About the call	The programme received funding from the "FEDER-FSE - Mayotte (État)" Operational Programme for the 2014-2020 programming period. The investment falls under the priority "Education and training".
ESIF good practice features	<p>The project exhibits several good practice features, namely:</p> <ul style="list-style-type: none"> - It combines elements of social and economic development. It has a positive impact on employment skills, targeting a group would otherwise encounter difficulties in their integration to the job market. The type of vocational training provided reflects the professions where there is a shortage of labour.

Project fiche 5 – Construction of a Professional Training Division with the Adapted Military Service In Mayotte, RSMA-M

	<ul style="list-style-type: none"> - It is aligned with local development strategies and makes a clear contribution to Europe 2020 and ESIF objectives.
Project Outputs	During the current programming period, the RSMA in Mayotte increased the number of participants in line with original targets. While in 2013 this number stood at 554, by 2019 it had risen to 701. This is partly due to the inauguration of the new facility, which can house some 150 participants.
Project results	In terms of providing young people with the skills needed to enter the job market, the results achieved by the RSMA programme are convincing. According to the 2019 yearbook, 63% of those finishing the training that year in Mayotte managed to secure long-term employment (i.e. more than six months), with further 18% finding temporary jobs. This overall success rate of 81% is in line with the 82% of participants who managed to obtain the certificate awarded by the programme (certificat d'aptitude personnelle à l'insertion).
Contribution to economic development	<p>The SMA is designed to focus on professional skills that are in shortage in the respective overseas regions. In the case of Mayotte, the training includes tiling, metalwork, painting, carpentry, building maintenance, electrical work, and training storekeepers specialised in air-conditioning. Moreover, the increase in the number of those enrolled also reflects the higher level of demand for labour.</p> <p>The fact that the programme enables participants to acquire professional skills tailored to the needs of the local job market is an essential boost to an island with a relatively small population and economy.</p>
Contribution to social development	<p>Social development is one of the main goals behind the creation of the SMAs. The programme explicitly targets young people from vulnerable backgrounds and supports them in finding long-term employment. Moreover, non-discrimination and gender equality are important principles for the implementation of the programme.</p> <p>In 2019, 53,3% of the volunteers in Mayotte were illiterate. The fact that over 80% of all participants managed to find a job after the completion of the programme underlines its effectiveness.</p>
Contribution to environmental development	The project had no environmental goals.
Innovation and potential for technological spin-offs	Innovative solutions and technology development are outside the scope of the project.
Contribution to EU objectives	The project clearly contributes to the objective of promoting social inclusion and combating poverty of the Europe 2020 strategy. It helps relatively disadvantaged areas and through support to acquire skills needed in local markets, it contributes to the economic development of the respective regions.
Transferability	In theory, the project is easily replicable. Nonetheless, the involvement of the army in the provision of professional skill training programmes is a unique feature and might not be easily implemented in other Member States. An additional specificity is that the programme focuses

Project fiche 5 – Construction of a Professional Training Division with the Adapted Military Service In Mayotte, RSMA-M

	<p>on overseas regions with societal and economic conditions that differ from most European Member States.</p>
<p>Additional information / sources</p>	<p>Sources:</p> <ul style="list-style-type: none"> – SMA website, background (link) – European Commission DG REGIO information page on the project (link) – European Commission DG REGIO website on the OP (link) – RSMA-M website (link) – SMA yearbook 2013 (link) – SMA yearbook 2015 (link) – SMA yearbook 2019 (link) – Jean-Pierre Jeantheau - Le Service Militaire Adapté : Un modèle pour la formation professionnelle des jeunes en difficulté d'intégration ? (link)

Project fiche 6 – In-Control	
Basic information	
Project title	In-Control
Member State	Germany
Fund	ERDF
Total project amount	€ 1,055,045
EU co-financing rate	50% (€ 527,523)
Thematic Objective	TO 1 "Strengthening research, technological development and innovation"
Lead partner(s)	
Lead partner	ExxpertSystems GmbH
Legal identity of promoter / lead partner	Company
Other partner(s)	FFT Produktionssysteme GmbH & Co. KG, BIBA - Bremer Institut für Produktion und Logistik GmbH
Final beneficiary(ies)	Large aerospace companies such as Boeing and Airbus
Activity	
Project theme	Innovation, Research and technological development
Project overview	<p>The vision of In-Control is to create a modular approach to the design architecture of test environments for prototyping in the aerospace industry (which are used throughout the development life cycle). This is based around the 'Lego brick' module principle, which allows to assemble test systems via defined interfaces after plug and play. The module principle is based on the fact that test environments are constructed from number of generic basic components; and leads to model architectures that are modular, scalable, and flexible.</p> <p>This vision would enable a major improvement compared with existing test environments, where reuse of these environments or their components is rarely possible due to a lack of standards and interfaces.</p> <p>Three key benefits are envisaged:</p> <ul style="list-style-type: none"> - First, more cost-effective maintenance due to the exchangeability of individual components - Second, minimised obsolescence problems are minimised due to common standards - Third, rapid establishment of new test systems through a common set of modules. <p>The project is about building test plants that are modularly constructed. For high lift devices there are certain test facilities, which are there for one task. However, test facilities for A380 are very expensive. With Plug & Play test facilities can be configured differently and become more cost effective.</p> <p>The overall objective of In-Control is to develop and set up the first stage (basic module) of an evaluator environment. It integrates fast and flexible industrial system concepts and technologies for testing and evaluation. A test environment for annual testing of manufacturing equipment provides</p>

Project fiche 6 – In-Control	
	a use case for evaluation of the research activities. The technology will also be evaluated for broader application in the production environment.
Range of activities	<p>There are three broad categories of activities that enable this approach:</p> <ul style="list-style-type: none"> – Short-term implementation of test systems in Lego module design, i.e. by means of various functional modules that can be combined using open interfaces. – Test systems can be used over the entire life cycle of a product (development, production up to maintenance). – During the development process, physical test components are continuously extended or adapted. Released physical modules can be used for other test tasks. <p>The modular architecture based on established technologies from the production environment allows for a connection to new manufacturing paradigms (such as Industry 4.0) based on proven industry standards.</p> <p>There is a physical as well as a virtual part in it. Each area is realised via a number of specific building blocks that use a common interface description. A number of advantages can be realised with the test environments set up in this way:</p> <ul style="list-style-type: none"> – Easily adaptable to different specimens and testing tasks. – Adaptable over the entire product life cycle. – Universally applicable components at the start of the lifecycle (development, production), mid-life(operation, maintenance, repair) and end-life(functional tests e.g. in connection with reuse / "Lifetime Extension"). – Time required for development and commissioning drastically reduced. – Development risks minimised. – Use of existing and established technologies - including those from the field of production automation
Extent to which project is dual use or defence related	The project is a civil project benefitting passenger planes of Boeing or Airbus and thus dual use because the implementation of test systems in Lego module design for components such as high-lift devices can easily be transferred to military aerospace as high lift devices are widely used in modern civil and military aviation.
About the call	The project has been selected according to various criteria, e.g. whether SMEs are involved, economic benefits, technological criteria, etc.
ESIF Good practice features	The project leads to significant cost advantages in conception, implementation, maintenance, and repair.

Project fiche 6 – <i>In-Control</i>	
	Innovative project that includes a SME; practical application of AI when carrying out the project.
Project outputs	The basic principle of the project has been proven to achieve modular design on a test facility.
Project results	The technical goals have been achieved; the implementation was handicapped due to the COVID-19 pandemic.
Contribution to economic development	Economic development of the participating firms and the ultimate beneficiaries.
Contribution to social development	Limited: the project would have created jobs but was restricted by the COVID-19 pandemic
Contribution to environmental development	The project leads to higher resource efficiency, extending the lifetime of airplane components and facilitating production and maintenance
Innovation and potential for technological spin-offs	The innovative idea is to no longer use test environments for one purpose or phase of the product life cycle. Instead, testing is understood as a life cycle spanning task, which is supported by common standards and a flexible architecture in such a way that product quality and safety continue to increase while development times and costs decrease.
Contribution to EU objectives	Contribution to the EU objective of strengthening research, technological development, and innovation
Transferability	Successful cooperation between research and the private sector, including a SME
Additional information / sources	<p><i>Sources:</i></p> <p><i>Interview with MA in Bremen</i></p> <p>Project homepage (link)</p> <p>Paper on Optimization of High lift device system deployment for takeoff performance (link)</p>

Project fiche 7 – Defence Forces Employment Support Scheme (DFESS)	
Basic information	
Project title	Defence Forces Employment Support Scheme (DFESS)
Member State	Ireland
Fund	ESF
Total project amount	€ 840,000
EU co-financing rate	66.67% (€ 560,000 of which € 280,000 from YEI and € 280,000 from ESF)
Contribution to Thematic Objective	TO8 “Promoting sustainable and quality employment and supporting labour mobility”
Lead partner(s)	
Lead partner	Department of Defence
Legal identity of lead partner	Ministry of Defence
Other partner(s)	Defence Forces, the Department of Employment Affairs & Social Protection (DEASP) and the relevant Education and Training Board.
Final beneficiary(ies)	Unemployed people aged between 18 and 24 years old
Activity	
Project theme	Social Inclusion
Project overview	<p>The Defence Forces Employment Support Scheme is an initiative designed to support young unemployed facing significant social and economic barriers to entering the labour market. The main purpose of the scheme is to provide participants with the knowledge and skills and enhance their capacity to pursue employment, work experience or further educational opportunities. The main objectives of the DFESS are as follows:</p> <ul style="list-style-type: none"> - To improve personal development, motivation, self-esteem, social skills and confidence - To assist in the development of a path to greater economic independence - To provide participants with skills that will help them to find to enter the labour market or other educational opportunities - To educate the participants on the importance of physical fitness and endurance, and to increase their personal level of fitness and endurance - To expose the participants to an environment which encourages personal development, team working, achievement and hard work - To improve communication and interpersonal skills, in particular, their ability to communicate more effectively with prospective employers <p>The scheme was developed and managed by the Department of Defence in cooperation with the Defence Forces, the Department of Employment Affairs & Social Protection (DEASP) and the relevant Education and Training Board.</p>
Range of activities	<p>The scheme includes two training sessions per year. Each session takes place over ten weeks, and it is composed of 2 main strands: one focusing on theoretical learning and the other one on physical training.</p> <p>The formal learning includes courses on IT programmes, Communication skills, SOLAS Safe Pass, Manual Handling, Basic Medical Training and Team Work.</p>

Project fiche 7 – Defence Forces Employment Support Scheme (DFESS)	
	The physical training focuses instead on improving the physical fitness of participants, and it also includes courses on basic survival techniques such as orienteering and other activities such as abseiling and canoeing.
Extent to which project is dual use or defence related	The project is defined as a defence related project as it involves defence stakeholders. They are the Department of Defence and the Defence Forces which are respectively the project leader and one of the partners.
About the call	The project was not selected under a call for proposals. It is the follow-up of a successful pilot project launched in June 2016. The pilot took place in Gormanston from June to August 2016 and involved 25 participants.
ESIF good practice features	<p>The following elements make the project a good practice:</p> <ul style="list-style-type: none"> - The project was implemented by military stakeholders but focused on supporting young unemployed people who face social and economic barriers to enter the labour market. In this way it supported social inclusion; - DFESS is a good example of a project providing civil and defence related benefits. On one hand it provides participants with new skills that can help them enter the labour market. On the other hand, defence forces can benefit from what could be the "space capacity". Most defence forces they are over staffed to be able to respond in case of unpredictable events and crises and have spare capacity that can be employed in such trainings.
Project outputs	<p>After the completion of the training, participants are expected to:</p> <ul style="list-style-type: none"> - Enhance social and teamwork skills; - Increase their self-confidence, self-discipline, self-motivation and self-worth; - Obtain practical skills and qualification which will enhance employment and further education; - Improve physical fitness and shape; - Increase confidence when communicating with employers. <p>No data were found on the project achievements so far. However, an indication of them is given by the evaluation report of the DFESS pilot project launched in 2016. Overall, the 25 participants indicated to have achieved all the points listed above.</p>
Project results	The evaluation of the pilot project reports successful results in all the training modules for most of the participants. In addition, for each successful participant, the employment prospect was improved.
Contribution to economic development	As for employment, the number of participants in the project is too low to have an impact on the local/regional economic development.
Contribution to social development	The social development is one of the key goals of the project. As mentioned above DFESS is expected to have substantial impact on the improvement of social, practical, physical and personal skills of participants. The Department of Defence, which implemented the project, is strongly committed to promote equality and prohibiting discrimination in employment.
Contribution to environmental development	The project did not have any specific environmental goals.

Project fiche 7 – Defence Forces Employment Support Scheme (DFESS)	
Innovation and potential for technological spin-offs	No potential for technological spill-over effects was identified.
Contribution to EU objectives	The project contributes to the thematic objective promoting sustainable and quality employment and supporting labour mobility and to the YEI specific objective to raise the skills and education levels of people by providing education, training, work experience and/or work opportunities, including support for self-employment. In addition, it also clearly contributes to the Europe 2020 objective “social inclusion”.
Transferability	Overall, the programme can be easily replicated and implemented in other territories. However, the fact that the Department of Defence implements it could be an element not easy to replicate in other Member States/regions.
Additional information / sources	<p>Sources:</p> <ul style="list-style-type: none"> • Project website http://www.dsfa.ie/en/Pages/Employment-Support-Scheme-(ESS).aspx • Defence Forces Employment Support Scheme – Evaluation report https://assets.gov.ie/24220/093f1a04cf734a3e9880b9c26b32b9c5.pdf • PEIL 2014-2020 Activity Implementation Plan ESF PR 4.9 • Interview (questionnaire) with the Head of Compliance and Verifications, ESF Managing Authority

Project fiche 8– Cyber Trainer Project	
Basic information	
Project title	Cyber Trainer Project
Member State	Italy
Fund	ERDF
Total project amount	€ 3,181,645
EU co-financing rate	50% (€ 1,590,823)
Contribution to Thematic Objective	TO 1 “Strengthening research, technological development and innovation”
Lead partner(s)	
Lead partner	Leonardo SPA
Legal identity of promoter / lead partner	Company
Other partner(s)	Partners include research institutions and companies: <ul style="list-style-type: none"> – Reiss Romoli SRL – G&A Engineering SRL – TEKNE SRL – Università degli Studi dell'Aquila – SinTau SRL
Final beneficiary(ies)	Key actors in the field of cyber security. They include experts operating in different aspects of cybersecurity such as operational management and governance and also recent graduates who enter the market for the first time.
Activity	
Project theme	Innovation, Research and technological development
Project overview	The Cyber Trainer Project aims to create a technological demonstrator that will allow the definition and creation of realistic, circumscribed and controlled environments (networks, systems and applications) for training cybersecurity managers and operators, both in reference to individuals and workgroups.
Range of activities	<p>A Cyber Trainer (or Cyber Range) is an interactive, simulated representation of a system, tools and applications that are connected to a simulated network environment in order to replicate the execution of cyberattack (“red team”) and defence operations (“blue team”). Systems can be composed of a combination of Information and Communication Technologies, Operational Technologies, Internet of Things devices, and Embedded systems. A record of the sessions is kept and can be subsequently replayed and analysed by “white team”.</p> <p>The project aims to design and implement a technological demonstrator and define suitable techniques and methodologies to enable service activities in:</p> <ul style="list-style-type: none"> – Education, training and updating of personnel specialised in cyber security, new defence techniques and organisational practices for managing cyber security. – Testing equipment and devices through realistic test environments, with specific regard to security needs related to emerging technologies, such as the Internet of Things and 5G communications.

Project fiche 8– Cyber Trainer Project	
	<ul style="list-style-type: none"> – The characterization of services related to operational scenarios of significant industry domains for the Abruzzo Region (e.g.: ICT, motorist, domotic, electromedical and telecommunications sectors).
Extent to which project is dual use or defence related	The project will demonstrate a dual use value of its results through modelling and experimentation of scenarios that are also of interest to Law Enforcement and Defence Administrations. The demonstrator will be equipped with functionalities that simulate attack scenarios. This provides the means to observe and evaluate the behaviour of operators and attackers in a flexible and manageable environment. Other relevant features include: rapid reconfiguration of training scenarios and the possibility of reproducing different types of networks, both civil and military. The training will offer features for testing new cyber security products and the inherent security features of components, devices and equipment and for analysing new threats.
About the call	<p>The Cyber Trainer Project was funded by the European Regional Development Fund (ERDF) for the period 2014-2020 and, more precisely, the Regional Operational Programme (ROP) of Abruzzo. The ROP ERDF Abruzzo encompasses 698 projects and a budget of € 193.2 million . Its main themes are research and innovation (38%), environment (25%) and digital agenda (14%).</p> <p>The project is part of the thematic axis “Research, technological development and innovation” and represents the Action Line 1.1.1 (“Support for research projects of enterprises involving the employment of researchers in the enterprise”).</p>
ESIF good practice features	<p>There are several elements that make this project a good practice:</p> <ul style="list-style-type: none"> – The project is in line with regional strategies, in particular it contributes to the Abruzzo S3 strategic objective “Improve the security of organisations and ICT systems”; – The demonstrator introduced by the project will be used in sectors such as ICT, automotive, home automation, and some defence domains that play a key role in the regional economy; – The project is expected to have positive effects in the local community, creating employment benefits; – The project developed an important networking mechanism involving local actors such as SMEs, universities, large enterprises that will help the knowledge transfer.
Project outputs	<p>The key output of the project is a demonstrator that allows realistic simulation of networks, systems and applications with the aim of facilitating the training of people operating with in Cyber Security. The demonstrator includes three modules:</p> <ul style="list-style-type: none"> – Learning: this module provides specific courses in the field of Cyber Security; – Training: it allows the trainees to carry out individual or group exercises based on realistic scenarios; – Testing and prototyping: it allows trainees to prototype cybersecurity mechanisms and tools and to test them.
Project results	The main expected result of the project is an improvement in skills and knowledge of those working in the Cyber Security sector. This is particularly important in the Abruzzo region where Cyber Security is an essential component of critical economic sectors: automotive, ICT, etc.

Project fiche 8– Cyber Trainer Project	
Contribution to economic development	Economic development is not the main objective of the project. However, it is expected to have a positive impact on the economic growth of SMEs operating in key sectors like ICT and automotive through providing access to learning, training, and test activities which is currently not available.
Contribution to social development	The main impact of the project is expected in the social development of the region. Cyber Trainer specifically addresses the challenge of cybersecurity skill shortage in the region. It will develop new skills in the field of cyber security and also attract high skilled employment specialised in cybersecurity related issues.
Contribution to environmental development	The project does not have any environmental goals.
Innovation and potential for technological spin-offs	The main innovation introduced by Cyber Trainer consists of the definition and preparation of test environments for new products, to improve the flexibility of methods and technologies that are currently available, and to provide test environments on specific devices and application domains. The integrated approach used for the implementation of the project, involving several actors from the business sector, is also expected to facilitate knowledge transfer to enterprises and key actors operating in relevant sectors.
Contribution to EU objectives	Cybersecurity contributes to the Europe 2020 objective “Increasing combined public and private investment in R&D”.
Transferability	<p>The possible fields of application of the project include industrial segments that are crucial for the economy of the Abruzzo Region, such as the automotive sector, smart cities, energy efficiency and critical infrastructure.</p> <p>In terms of replicability, the project can be replicated in other territories, but some enabling conditions need to be in place:</p> <ul style="list-style-type: none"> - The presence of Universities highly specialised in cybersecurity; - A strong network of enterprises operating in relevant sectors; - Research activities already performed in the field of cybersecurity; - Presence of innovative SMEs.
Additional information / sources	<p>Sources:</p> <ul style="list-style-type: none"> - Project websites: OpenCoesione. Leonardo SPA. Cyber Trainer Project (link) - Leonardo to lead "Cyber Trainer" project in the Abruzzo Region of Italy (link) - CyberTrainer - Tekne with Leonardo in Cyber Security field (link) - Programme websites: OpenCoesione. POR FESR Abruzzo (link) - Programma Operativo Regionale (POR) FESR 2014-2020 Regione Abruzzo - Interview (questionnaire) with the beneficiary (Leonardo Spa).

Project fiche 9 – SIntegraM - Developing Spatial Data Integration for the Maltese Islands	
Basic information	
Project title	SIntegraM - Developing Spatial Data Integration for the Maltese Islands
Member State	Malta
Fund	ERDF
Total project amount	€ 7,000,000
EU co-financing rate	57% (€ 4,000,000)
Contribution to Thematic Objective	TO2 "Enhancing access to, and use and quality of information and communication technologies (ICT)" and TO6 "Preserving and protecting the environment and promoting resource efficiency"
Lead partner(s)	
Lead partner	Maltese planning Authority
Legal identity of promoter / lead partner	State authority
Other partner(s)	Public sector and Public service entities
Final beneficiary(ies)	Civil society
Activity	
Project theme	ICT and digital society; Innovation, Research, and technological development; Knowledge and technology transfer
Project overview	<p>SIntegraM aims to simplify spatial data management and create a real-time system to make spatial data and maps accessible to all government entities, including defence related entities and the civil society. It builds on the need to improve the quality of spatial data in Malta. So far, Malta's maps used by the decision-makers and the respective updating process have not been consistent among different entities. The project will update Malta's maps with a modern approach: drones and cameras will map Malta's topography and Malta's underwater, rivers, and lakes and collect spatial data. Data collected will then be elaborated, and 3D maps will be available in an IT portal. The objectives of SIntegraM are:</p> <ul style="list-style-type: none"> - Develop a national spatial data infrastructure - Building human capacity in the spatial themes across all governmental entities - Adhering to the requirements of EU and national relevant legislation
Range of activities	<p>The project includes a wide range of activities, covering spatial data collection, processing, and publication of 3D maps. The following activities were performed:</p> <ul style="list-style-type: none"> - identification of information gaps in the data cycle; - creation of new base maps; - integration of all data in a national system; - creation of data exchange security protocols; - the building of infrastructure; - training experts.
Extent to which project is dual use or defence related	<p>The project is a dual use project. The 3D maps produced and made available can be used for defence related activities. The spatial data management systems will contribute to improving information management. In particular, the topography and underwater maps could be useful for locational analysis and integration within defence and security systems. In addition, 3D maps allow entities to visualise the infrastructures and help them to create possible scenarios for security and defence purposes.</p>

Project fiche 9 – SIntegraM - Developing Spatial Data Integration for the Maltese Islands	
About the call	The project was selected under an ERDF call for proposal published in 2015. Among projects selected under the call there is CONVERGE, a project that sought to bring all public sector and public service entities to build their systems on a common horizontal structure to ensure interactivity. SIntegraM was also asked to support the CONVERGE project to implement some of its components through other agencies to ensure the creation of a Land Registry system and a Spatial Forensics infrastructure. The cooperation with the CONVERGE project strengthens the dual use element of the project, which will serve civil and defence purposes.
ESIF good practice features	Several elements make this project a good practice: <ul style="list-style-type: none"> - The project proposes an integrated national system for spatial data and dissemination of information, which represents a very innovative element for the public sector. This new system will also help to perform defence related activities more efficiently (e.g. underwater control and information management); - The project reflects the priorities included in the RIS3 as it brings on board an innovative way for new policy-making and decision-making processes in all fields such as development planning, transport transformation, health, and social issue mitigation, security and defence issues; - The project fits into the Maltese Government Digital Strategy as it provides a baseline and specialised thematic data that make it more competitive and knowledge-based.
Project outputs	In line with the project objectives listed above, SIntegraM produced the following outputs: <ul style="list-style-type: none"> - Integrated datasets and systems containing spatial maps; - Deployment of new software for the management of spatial data; - Courses and training for the users of spatial data in various public and private entities; - Protocols for the exchange of data in compliance with EU and national legislations.
Project results	SIntegraM has long-term results and value. It contributed to consistently improving spatial data management and enhanced the consistency of maps and information by using real-time systems. The system designed by the project also improved the accessibility of spatial data to external users (e.g., business). Thanks to SIntegraM, Maltese policymakers and entities from the private sector can now use consistent information to implement urban development projects. In terms of employment, as a consequence of the project implementation, a specialised stream was created in the Maltese governments based on spatial data-related skills. The project also ensures that Malta will be able to quickly react in the case of a natural disaster (e.g., earthquake, tsunami, etc.) using real-time maps. As the project also collects and processes data on the underwater, it helped strengthen the underwater control for defence purposes.
Contribution to economic development	The project contributed to consolidate spatial data and improve information sharing among different public and private entities. The improved quality of spatial information available to policymakers and businesses constitutes a key element to implement projects that fit the local communities' needs and contribute to Malta's economic growth.
Contribution to social development	The project affected the organisation of employment at government level. A new career stream related to GIS and spatial data competencies was created to ensure the development of technology and progress. Several calls for employment were published in the field. As SIntegraM also provided access to spatial data and information to businesses, the employment switch is also expected to happen in the private sector.

Project fiche 9 – SIntegraM - Developing Spatial Data Integration for the Maltese Islands	
Contribution to environmental development	The project does not have any specific environmental goals. However, the new integrated approach for spatial data could indirectly contribute to a more sustainable urban development.
Innovation and potential for technological spin-offs	SIntegraM proposes an innovative integrated and strategic approach to spatial data. The key concept is to use specific (aerial, terrestrial, and marine) technologies to collect spatial data processed by software capable of rendering real-time 3D maps. The most innovative element is that maps are made available at an inter-governmental portal. Government entities can thus access the same information at the same time. Another important element is that spatial data and maps will be also made available to private entities.
Contribution to EU objectives	The project is aligned to ESIF thematic objectives: enhancing access to and use and quality of ICT and preserving and protecting the environment, and promoting resource efficiency.
Transferability	The project's transferability is strictly dependent on the characteristics of the territory where the project would be replicated. SIntegraM has good potential for replication in small and border territories and islands such as Malta, while in larger regions, it could be costly and challenging to implement.
Additional information / sources	<p>Sources</p> <ul style="list-style-type: none"> - Project websites (Here, Here, and Here) - European Commission website (link) - Interview (questionnaire) with the Malta Planning Authority (Beneficiary)

Project fiche 10 – Brain Computer Interfaces (BCI) field lab	
Basic information	
Project title	Brain Computer Interfaces (BCI) field lab
Member State	Netherland
Fund	ERDF
Total project amount	€ 1,409,430
EU co-financing rate	15,8% (€ 222,346)
Thematic Objective	TO 1 “Strengthening research, technological development and innovation”
Lead partner(s)	
Lead partner	Thales Nederland B.V.
Legal identity	Company
Other partner(s)	Vidinexus Vof, Artinis Medical Systems B.V., Noldus Information Technology B.V., Universiteit Twente
Final beneficiary(ies)	Universities, research institutes, armies & companies
Activity	
Project theme	Innovation, Research, and technological development
Project overview	<p>In the Testbed for Brain-Computer Interfaces, University of Twente, Thales, Artinis Medical Systems, Noldus Information Technology and VidiNexus work on the development of applications for BCI and the technology required to both sense and utilize brain signals. The BMS Lab hosts the BCI testbed at its lab facilities.</p> <p>Brain Computer Interfaces (BCIs) make the connection between the signals in our brain and computer systems. Computers learn from our brain and vice versa. For example, BCIs are already being used in the medical world, where patients' devices are controlled directly from the brain. At the same time, artificial intelligence and deep learning are on the rise. That is also what the new project focuses on. It will include projects that deal with mental workload and collaboration, and ways to relieve pressure. In addition, the BCI testing ground is open to companies that want to explore what the technology can mean for them. The physical location of the BCI testing ground is at the University of Twente campus.</p> <p>Key in this development process is the application of these technologies in fields with practical value for companies and professionals. With this partnership, BMS Lab aims to contribute to the economic, technical, and societal development of the Eastern Netherlands.</p>
Range of activities	<ul style="list-style-type: none"> - Laboratory infrastructure including tools and technologies. Data management, and the ethical dimension of the usage of personal data. - The BCI solution workload module. The objective is to find an algorithm to predict the workload of workers. The idea is that the subject wears an EEG headset, and the algorithm can predict the current workload. - Interactive displays in meeting rooms in which humans can interact with the displays. Information can flow from the human brain to the screens. - A command and control work package that measures multiple peoples brain activities at the same time. - Starts in 2019 and ends in 2021 revolves around finding business cases and is the focus for the remainder of the project.

Project fiche 10 – Brain Computer Interfaces (BCI) field lab	
Extent to which project is dual use or defence related	<p>In particular, the 4th work package, in which Thales Nederland, a defence company, is in the lead. Research on stressful situations of teams, also in command centre of marine ships (command and control situations), which makes the project defence related due to the involvement of Thales and dual use with regards to the other elements of the project.</p> <p>Human machine augmentation/enhancement is of growing interest in defence: for example in applications to help humans rapidly interpret complexity (dismounted soldiers) or aid decision-making through prioritisation of sensor data in time-pressured situations (such as flying a combat aircraft).</p>
About the call	<p>The Operational Programme of East Netherlands applies several criteria to select projects such as the contribution to the OP, the degree of innovation, the quality of the business cases, quality of the application and contribution to sustainable development</p> <p>The call did not have a particular focus on defence related or dual use activities.</p>
ESIF good practice features	<ul style="list-style-type: none"> - Market-driven solutions were anticipated by the project when applying for the call. The aim was to not do research for research sake, but how to utilize the technologies and find practical solutions. - This project is a good example of a successful collaboration between a university, SMEs, and industry. - The different project partners benefitted from each other. - The companies benefited from the expertise and the academic skills in the university and the university benefitted from the entrepreneurial skills, particularly shown by the SMEs and the market knowledge of the industrial partner.
Project outputs	<ul style="list-style-type: none"> - Setting up an infrastructure for a BCI field lab at the University of Twente, which can be used for empirical studies by the private sector. - Research on a BCI algorithm to predict workload of workers - Human interaction with displays using BCI in situations such as in command centres - Measurement of multiple people's brain activities at the same time with the help of BCI
Project results	<ul style="list-style-type: none"> - Putting East Netherlands on the map as a region with a potential to become a leader in BCI - Infrastructure in the University of Twente which is planned as a sustainable facility that can be used by SMEs and companies in the future
Contribution to economic development	<p>Research and development project in a promising field with broad potential for the future in every field where humans interact with technology.</p> <p>Contribution to OP priority in the area of High Tech Systems & Materials.</p> <p>5 business cases are being developed until end of 2021. When they are brought to the market, this is valuable to the participating companies, of which four are SMEs, as they can hire more people increasing employment in the region.</p> <p>A new facility set up in the region leading to employment and business cases. Ideas around the project can use this facility</p>
Contribution to social development	<p>European funds help companies to hire new staff or interns and universities to hire new PhD students.</p> <p>Creation of 40 new jobs, including PhD students</p>

Project fiche 10 – Brain Computer Interfaces (BCI) field lab	
Contribution to environmental development	N/A
Innovation and potential for technological spin-offs	High innovation potential, ongoing last work package aimed at developing business models, helping in particular the participating SMEs that are entrepreneurial and open to shift its supply to where the demand is.
Contribution to EU objectives	Contribution to cohesion as East Netherlands is a region which somewhat suffers from the most qualified workers moving to the metropolitan area in West Netherlands. As a research and development project it contributes to the target of the Europe 2020 strategy. Especially the Research & Development target of more than 3% of GDP to be invested in the R&D sector but also the Employment target of more than 75% of the population aged 20 to 64 years to be employed.
Transferability	The setup of the consortium can be easily replicated and can serve as an example for other projects. The mix of academic skills in the university, entrepreneurial skills of SMEs and the sustainability of an industry actor leads to added value and mutual reinforcement.
Additional information / sources	<p>Sources:</p> <p><i>Interview with beneficiary</i></p> <p><i>Interview with Overijssel Province MA</i></p> <p>BMS Lab University of Twente (link)</p> <p>BCI Testbed at the University of Twente (link)</p> <p>Project description (link)</p>

Project fiche 11 – Decision Aid for Marine Munitions (DAIMON)	
Basic information	
Project title	Daimon – Decision Aid for Marine Munitions
Member State	Poland, Germany, Finland, Norway, Sweden
Fund	ERDF (INTERREG), ENI, Norway
Total project amount	4,726,449.76 EUR
EU co-financing rate	74% (€ 3,524,946 from ERDF)
Thematic Objective	TO 6 “Preserving and protecting the environment and promoting resource efficiency”
Lead partner(s)	
Lead partner	Instytut Oceanologii Polskiej Akademii Nauk (IOPAN) (PL)
Legal identity	Non-profit organisation
Other partner(s)	<p>Other partners are research institutes and public bodies:</p> <ul style="list-style-type: none"> - Polish Naval Academy (PL); - Technical University of Clausthal (DE); - EGEOS GmbH (DE); - Thünen Institute of Fisheries Ecology (DE); - Finnish Institute for Verification of the Chemical Weapons Convention (VERIFIN) (FI); - Finnish Environment Institute (SYKE) (FI); - Chalmers University of Technology (SE); - Norwegian Defence Research Establishment (FFI) (NO); <p>Other strategic partners, associated organisations and other collaborators are:</p> <ul style="list-style-type: none"> - BLANO - Munitions in German Marine Waters (DE); - Alfred Wegener Institute Helmholtz Centre for Polar and Marine Research (AWI) (DE); - Maritime Institute in Gdańsk (MIG) (PL); - Military University of Technology (MUT) (PL); - Lithuanian Environmental Protection Agency (LEPA) (LT); - International Dialogue on Underwater Munitions (IDUM) (NL).
Final beneficiary(ies)	Local and national maritime, defence and environmental administrations
Activity	
Project theme	Environment
Project overview	<p>DAIMON I project (2016-2019), was an international scientific collaboration project aimed at solving the issue of underwater munitions. In the Baltic Sea and the Skagerrak there is still a high quantity of chemical and conventional munitions dumped after the second World War. These munitions contain hazardous substances. As the use of the seabed has increased over time, the presence of dumped munitions, and explosives could cause direct emissions of hazardous substances in the surrounding environment and create health risks for humans and wildlife.</p> <p>The project aims to address the lack of knowledge of the environmental and ecological implications of some of the substances contained in dumped munitions. It focuses on collecting information and evidence on the effects of dumped munitions and developing specific techniques and methodology for the risk assessment.</p>

Project fiche 11 – Decision Aid for Marine Munitions (DAIMON)	
	The DAIMON I project was renewed for a follow-up project called DAIMON II (2019-2021) to apply the tools created and to promote their use in maritime administrations through events and training.
Range of activities	<p>The project included the following activities:</p> <ul style="list-style-type: none"> - Data collection through missions in-situ. A ship with a video recording was deployed to munition sites to record and categorise different munitions types; - Collection of samples of water, seabed, plants and fish to assess with laboratory analyses the level of emissions coming from munitions and investigate the health of plants and fish; - In-situ studies analysing the environmental effect of hazardous substances contained in dumped munitions; - Building on the results of the analysis the project team developed a set of tools containing information on munition types and their ecological and environmental implications, methods for the risk assessment.
Extent to which the project is dual use or defence related	The project is defence related as the consortium implementing the project includes defence stakeholders: Polish Naval Academy and Norwegian Defence Research Establishment.
About the call	<p>The project was funded under the First call for the INTERREG Baltic Sea Region Programme (2014 – 2020) under the Priority Axis 2 “Efficient management of natural resources”, specific objective 2.1 “Clear Waters” which aims to increase the public and private stakeholders knowledge and capacity of dealing with water quality issues to reduce the discharge of hazardous substances to the Baltic Sea.</p> <p>The call did not include any references to defence or dual use as ‘defence public and private entities’ are not the target group of the programme. The focus of the call was to select projects fitting under the clean water priority.</p>
ESIF good practice features	<p>There are several features, which make this project stand out as a good practice:</p> <ul style="list-style-type: none"> - The project is expected to increase economic opportunities. Having cleaner waters and seabed will create more investment opportunities (e.g. pipelines) and consistently increase economic opportunities for entities operating in the blue economy; - DAIMON I has a strong technological potential for spill-overs as the innovative tools developed can be potentially used by several types of public and private entities for various purposes; - The project is aligned with local strategies (e.g. Baltic Sea strategy and RIS3) that have clean waters and the treatment of hazardous substances and blue economy as main priorities; - The project brought together research institutions, environmental agencies, defence institutions, maritime authorities, and NGOs from seven EU member states that cooperated to create multiple transferable tools to address a shared challenge.
Project outputs	<ul style="list-style-type: none"> - Decision Support System for marine munitions (DSS), an online tool providing a specific risk analysis for each munition type; - Catalogue of Baltic Sea dumped munitions types, covering all the type of chemical and conventional munitions dumped in the Baltic sea;

Project fiche 11 – Decision Aid for Marine Munitions (DAIMON)	
	<ul style="list-style-type: none"> - EcoTox Toolbox, consisting of guidance including strategies on how to address environmental and ecological risks for marine plants and fish, caused by dumped munitions; - Baltic Sea Munition database including information on dumped munitions that can be updated by experts in charge of Baltic sea exploration.
Project results	Overall, the main result of the project is the increased knowledge and awareness of public authorities of the risks associated with dumped munitions, the methods to be used to assess those risks and how to deal with them.
Contribution to economic development	<p>Even if economic development is not the primary aim of the project, DAIMON can have a positive effect on the economy of areas relevant for the project. For example, the tools created can also be used to improve the quality of environmental impact assessments required for large investment projects. In this respect, one of the project partners was consulted for one pipeline investment project already.</p> <p>The fishing sector can also be affected positively through improved working conditions. Several fishermen organisations expressed interest in the project as they wanted to know the possible consequences for their activities and enquired about any implications regarding their safety.</p>
Contribution to social development	The project did not have social development goals.
Contribution to environmental development	The project developed several tools, which can contribute to making the Baltic sea cleaner. The tools developed under this project can also support the preparation of Environmental Impact Assessment to be performed for big investment projects and help improve the environmental sustainability of infrastructure investments (e.g. construction of a pipeline).
Innovation and potential for technological spin-offs	<p>The research performed under DAIMON I led to the design of a prototype that resulted in a patent application to the European Patent Office (EPO). In case it is approved, thanks to the project a new technology related to the underwater field can be offered to the market.</p> <p>The Decision Support System for marine munitions (DSS) is a very innovative element of the project. It is for the first time that policymakers are provided with a tool that is able to carry out a risk analysis for any given underwater munition object, including data about the location and overall state of the ammunition, the surrounding environment and the state of biological pollution/damage.</p>
Contribution to EU objectives	The project is in line with EU environmental policy. In particular it contributes to one of the priority objectives of the Environment Action Programme “Healthy environment for healthy people” This objective focuses on reducing air, water and soil pollution to protect the health and wellbeing of European.
Transferability	The tools developed can be potentially used by maritime authorities, military, coastal guards, environmental protection agencies, offshore companies, NGOs, educational institutions for several purposes and in different geographical areas.
Additional information / sources	<p>Sources:</p> <ul style="list-style-type: none"> - <i>Project website</i> (link) - <i>Programme website</i> (link) - <i>Action Plan for the EU Strategy for the Baltic Sea Region</i>

Project fiche 11 – Decision Aid for Marine Munitions (DAIMON)

- *Baltic Sea region AIR (2017)*
- *Baltic Sea region AIR (2018)*
- *Interview with Institute of Oceanology of the Polish Academy of Sciences (beneficiary) (Annex I)*
- *Interview with the Joint Secretariat of Baltic Sea region INTERREG programme (MA) (Annex II)*

Project fiche 12 – Active Protection Costume for EOD	
Basic information	
Project title	Active Protection Costume for EOD
Member State	Romania
Fund	ERDF
Total project amount	€ 4.86 million
EU co-financing rate	80% (€ 3.8 million)
Contribution to Thematic Objective	TO 1 “Strengthening research, technological development and innovation”
Lead partner(s)	
Lead partner	STIMPEX S.A.
Legal identity of promoter / lead partner	Company
Other partner(s)	Research centres: <ul style="list-style-type: none"> - Romanian Scientific Research Centre for CBRN Defence and Ecology; - National Institute for Research and Development for Non-Ferrous and Rare Metals
Final beneficiary(ies)	Explosive Ordnance Disposal operators
Activity	
Project theme	Innovation, Research and technological development
Project overview	<p>Active Protection Costume for Explosive Ordnance Disposal (EOD) is a project presented by a consortium led by SINTEX, an SME active in the chemical, oil and defence sectors. The main objective of the project is to minimise the risks that EOD operators face when identifying, disabling and dismantling explosives.</p> <p>The project aims to develop protective suits models using resistant and innovative materials and simulations for the design of the structure.</p>
Range of activities	<p>The project is an R&D project and includes several activities related to research, analysis and testing:</p> <ul style="list-style-type: none"> - Research activities related to innovative materials to be used for protective clothing; - Numerical simulation for the structures of protective clothing; - Elaboration of technical specifications for suit prototypes; - Making prototypes of protective clothing;
Extent to which project is dual use or defence related	<p>The Active Protection Costume for EOD can be considered a defence related project as:</p> <ul style="list-style-type: none"> - It was presented by a consortium involving defence stakeholders. The lead partner is an SME specialised in the defence sector, including the production of equipment, and the other project partners are both research centres specialised in defence issues; - The project aims to develop protective suits that will be used in the disabling and dismantling of EODs in military operations and civilian context.
About the call	<p>The project was selected in a 2020 call. It is among the pilot projects that received the EDA's dedicated support aiming at supporting defence projects to get access to ESIF funds. The consortium benefitted from the tailored-made technical support provided by EDA for the preparation of the application.</p>

Project fiche 12 – Active Protection Costume for EOD	
ESIF good practice features	<p>The Active Protection Costume for EOD is considered a good practice for the following reasons:</p> <ul style="list-style-type: none"> - It aims to develop innovative protective suits that contribute to lowering the risk of defence operators dealing with EOD; - It brings a strong innovation component as the protective suits prototype is developed using innovative materials; - The project is among the first R&T EOD projects funded with ESIF.
Project outputs	The main project expected output is the innovative protecting clothing designed explicitly for EOD. Additional identified outputs refer to the research, analysis and testing performed during the implementation such as report on the numerical simulations for the structure of the suits and results of the testing of prototypes of protective suits.
Project results	The project is expected to have a positive result, reducing the risk of military operators dealing with EOD in military missions and also civilian situations (e.g. terrorism, unexploded ammunition in former conflict zones).
Contribution to economic development	Economic development is not the primary objective of the project. However, it is expected to benefit enterprises operating in the defence sector that play a crucial role in the Romanian economy. The fact that the lead partner is a company could enhance the knowledge and technology transfer to other businesses, especially SMEs enhancing their economic growth.
Contribution to social development	The project does not have any social development goals.
Contribution to environmental development	Environmental development is outside the scope of the project.
Innovation and potential for technological spin-offs	The project introduces a solid innovative element as it aims to develop protecting suits for EOD made by innovative materials and using new methods for the definition and testing design requirements which consist of numerical simulations. As mentioned above, the project could facilitate knowledge transfer in the business sector and create a potential for spill-over.
Contribution to EU objectives	<p>The project contributes to the Europe 2020 objective “Increasing combined public and private investment in R&D to 3 % of GDP”. The project also contributes to the technology domain “Advanced Materials and structure” which is one of the priorities of EDA’s Capability Development Plan.</p> <p>The strong R&D component makes Active Protection Costume for EOD also relevant for one of the objectives presented in the EU_NATO joint declaration “Facilitate a stronger defence industry and greater defence research and industrial cooperation within Europe and across the Atlantic”.</p>
Transferability	The transferability of the project is limited. Some potential for replicability can be found in territories highly specialised in the defence sectors where a strong network including businesses, research centres and universities, is already active.
Additional information / sources	<p>Sources:</p> <ul style="list-style-type: none"> - <i>Project article</i> (link) - <i>Company website</i> (link) - <i>EDA website</i> (link) - <i>EDA success story</i> (link)

Project fiche 12 – Active Protection Costume for EOD

- [Programme website\(link\)](#)

Project fiche 13 – Smart Clothes with control and alarm function

Basic information	
Project title	Smart Clothes with control and alarm function
Member State	Slovenia
Fund	ERDF
Total project amount	€ 403,477
EU co-financing rate	80% (€ 322,781)
Contribution to Thematic Objective	TO 1 "Strengthening research, technological development and innovation"
Lead partner(s)	
Lead partner	Prevent & Deloza
Legal identity of promoter / lead partner	Company
Other partner(s)	Spirit Slovenia
Final beneficiary(ies)	Agents working in dangerous environments, like firefighters, soldiers and policemen.
Activity	
Project theme	Innovation, Research and technological development
Project overview	<p>The project aims to develop smart clothes with control and alarm functions. The smart protective suits are equipped with technological solutions that make them suitable for work in dangerous environments. They include:</p> <ul style="list-style-type: none"> - Communication devices: Wi-Fi and Bluetooth, GSM and a "Rescue-me" alarm to be used in critical situations; - Indoor location alarms; - External and internal sensors that monitor the gas, temperature, humidity and air pressure and internal temperature, heartbeat, breathing respectively; - Injuries protections; - Black box which allows the exchange of information and data storage.
Range of activities	<p>The project included a wide range of activities, from research to the production of clothes:</p> <ul style="list-style-type: none"> - Identification of design requirements according to user needs (e.g. sensor positioning, mobility requirements, etc); - Prototyping: once all parameters are defined, the initial aesthetic design is created; - Testing: prototypes are tested to check whether they meet user needs, and the performance is in line with expectations.
Extent to which project is dual use or defence related	"Smart Clothes with control and alarm function" is a dual use project. The protective suits produced can be used for both civilian and defence related purposes. They improve the security of people working in dangerous environments such as the military domain, firefighters, and the police.

Project fiche 13 – Smart Clothes with control and alarm function	
About the call	The project is funded under the Operational Programme for the Implementation of the EU Cohesion Policy 2014–2020. It was selected under the call "Strengthening the competencies and innovation potentials of companies" launched in December 2016. The call focused on innovative R&D projects related to the development of new or improved products, processes, or services with high innovation and market potential, which consequently increases the competitiveness of participating companies. It did not include any specific reference for dual use or defence related projects.
ESIF good practice features	Smart Clothes with control and alarm function is considered good practice for the following elements: <ul style="list-style-type: none"> - It is implemented by a company specialised in the design and manufacture of protective garments for military use. The main project output is a smart protective suit which can be used for civilian and defence related purposes; - It is expected to strengthen the market position of the company; - It integrates several innovative technologies in protective suits to improve the security of workers dealing with dangerous environments and life-threatening events.
Project outputs	The key output of the project is smart protective clothes. The suits integrate several technological components that offer support to people working in dangerous environments. The alarm systems warn about external and internal threats, and there is a Rescue Me alarm to be used in critical situations. Finally, the Black box, also inserted in the suits, allows to exchange information, store data, and inform the central base about the situation.
Project results	The main project results is a reduced risk of severe injuries and accidents. It ensures safer conditions for those working in dangerous situations, such as policemen, firefighters, and soldiers.
Contribution to economic development	No particular effects on the economic development of the region were identified for this project. However, the project supports the lead partner to explore the use of innovative technologies to develop more efficient smart clothes to be used in specific domains like military, police, firefighters. Once these innovative products are sold, they will contribute to strengthening the market position of the company.
Contribution to social development	The project does not have any social development goals.
Contribution to environmental development	No environmental objectives were included in the project.
Innovation and potential for technological spin-offs	The project has a strong innovative component. It integrates innovative sensors, communication tools, and other technologies in protective suits to protect soldiers, police officers, and firefighters from injuries and ensure a safer work environment.
Contribution to EU objectives	The project contributes to the Europe 2020 objective "Increasing combined public and private investment in R&D."
Transferability	The project can be replicated by companies already producing protective clothes and with a focus on defence related activities.
Additional information / sources	Sources: <ul style="list-style-type: none"> - <i>Spirits Slovenia website</i> (link)

Project fiche 13 – Smart Clothes with control and alarm function

- *Company website ([link](#))*
- *Call for proposal ([link](#))*
- *Slovenian ERDF Operational Programme for the Implementation of the EU Cohesion Policy in the period 2014 – 2020 ([link](#))*

Project fiche 14– Manufacturing of aeronautic components in composite material by RTM infusion technology	
Basic information	
Project title	Manufacturing of aeronautic components in composite material by RTM infusion technology
Member State	Spain
Fund	ERDF
Total project amount	€ 4,371,492
EU co-financing rate	80% (€ 3, 497,194)
Contribution to Thematic Objective	TO 3 “Competitiveness of Small and Medium-Sized Enterprises”
Lead partner(s)	
Lead partner contact details	TEDCOM INGENIERIA AERONAUTICA S.L.
Legal identity of promoter / lead partner	Company
Other partner(s)	--
Final beneficiary(ies)	TEDCOM INGENIERIA AERONAUTICA S.L.
Activity	
Project theme	Transport
Project overview	<p>The project undertaken by TEDCOM INGENIERÍA AERONÁUTICA, S.L. is a new initiative in the aeronautical industry, which aims to set up a plant in the province of Cadiz for the mass production of aeronautical structural elements in advanced composite materials, using RTM (Resin Transfer Moulding) and LRI (Liquid Resin Infusion) injection technology. The company acquired the AIRBUS DEFENCE AND SPACE, S.A. contract for the manufacture of structural parts (lower left and right crossbeam; upper left and right crossbeam and left and right strakes) for the fan cowl of the A320 NEO aircraft.</p> <p>The objective of the TEDCOM project is the production of aeronautical structural elements in advanced composite materials, using RTM and LRI technology. This technique consists of manufacturing parts in closed moulds on which the fibre fabric is placed and the resin is injected, leaving the finished part without the need for autoclave curing processes, thus obtaining greater efficiencies.</p>
Range of activities	<p>Some of the activities carried out during the project include:</p> <ul style="list-style-type: none"> • Creation and establishment of an SME in the innovation hub of Tecnobahía Park • Research and development on more efficient technologies in the aeronautical sector • Implementation of new techniques for manufacturing elements in RTM and LRI • Application of these innovations in specific projects, such as the manufacture of structural parts of the Airbus A320 aircraft • Training future workers in these new manufacturing techniques • Collaboration with regional institutions, such as local universities
Extent to which project is dual use or defence related	<p>This is a dual use project. The manufacturing techniques developed for the aeronautical sector can be used for civil or defence purposes. So far, the technological innovations created by TEDCOM have mainly served the manufacturing needs of the Airbus A320 NEO. The company is currently developing improvements in its RTM technology to apply it to new Airbus Defence projects.</p> <p>The Managing Authority remarked their interest in the promotion of dual use technologies in Andalucía. They have contacted the Spanish Ministry of Defence to identify emerging technologies that could be</p>

Project fiche 14– Manufacturing of aeronautic components in composite material by RTM infusion technology	
	<p>applied in dual use sectors. Moreover, the regional government of Andalucía has recently designed the Andalusian Aerospace Strategy 2027, whose aim is to fund initiatives characterised by their vocation for innovation, duality and international traction.</p>
About the Call	<p>This business project was developed within the framework of the Andalucía 2014-2020 Global Competitiveness-Innovation-Employment Grant, which is part of the Andalucía 2014-2020 ERDF Operational Programme. The aim of the 2014-2020 Global Grant is to improve competitiveness and increase the industrial base of Andalucía in order to boost economic growth and stable quality employment in the region. In addition, this funding call was related to the Andalusian Innovation Strategy RIS3 ANDALUCÍA, which identifies dual technologies and defence as areas of strategic opportunity for the region. As this project was aligned with the Specialisation Priority 2 on Advanced Industry Linked to Transport, it received additional funding points. The Managing Authority underlined the possibility of funding dual use and defence projects under this investment priority.</p> <p>Funding was obtained through the Agency for Innovation and Development of Andalucía (IDEA), an organisation related to the regional government that serves as an intermediate body of ERDF in the implementation of projects on R&I, industrial development, digitalisation and business promotion. IDEA provided an incentive of 1,224,017.74 euros, co-financed with ERDF-funds, to the beneficiary for the manufacture of aeronautical components.</p> <p>The beneficiary remarked its previous work with the Managing Authority and the financing opportunities available in the region. The company knew about the call through IDEA's newsletter and website, which they review periodically.</p>
ESIF good practice features	<p>Several features make this project stand out as a good practice:</p> <ul style="list-style-type: none"> It is aligned with regional development strategies due to its innovative character and its promotion of SMEs and the smart specialisation strategy priority in Advanced Transport Systems and advance manufacturing The project has had a significant impact in the local community through the training of local workers, creation of quality employment, anchoring knowledge to the region and collaboration with local institutions The project allowed to support the activities of an SME in the implementation of new and more efficient manufacturing techniques in the aeronautical sector that had not been previously implemented and that can be potentially used by other defence entities.
Project Outputs	<p>This project represents the culmination of previous works on technological innovation in the aeronautical industry. The objectives of the project were of twofold. On the one hand, the proper development of technological activities and the creation and maintenance of new quality jobs was the main goal of the project. On the other hand, there was an additional objective regarding the promotion of innovation in strategic sectors in Andalucía, as well as the anchoring of knowledge and skills in the region. According to the Managing Authority, the company was subject to a monitoring process during the development of the project, with both of its purposes satisfactorily met. Albeit the beneficiary also agreed that the main objectives of the project were achieved, the company emphasised the challenges they had to face in order to develop its activities, such as bureaucratic procedures and the shortage of skilled labour.</p>

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Project results	<p>The Managing Authority has stressed that the defence sector and dual use activities are a vector of innovation, industrial development and quality employment for Andalucía. Therefore, this sector enjoys the support of the government, the business community and research organisations in the region, making up a significant part of its commitment to smart specialisation, digitalisation, Industry 4.0 and sustainability.</p> <p>TEDCOM activities have had significant long-term impact in Andalucía, as highlighted by the Managing Authority of the project, which include:</p> <ul style="list-style-type: none"> • Improvement of the technological capacity of Andalucía and implementation of new technologies that had not been used in the region before. • Creation of stable quality employment in the technological sector, a pivotal area in the regional strategy for the promotion of innovation. • Anchoring knowledge to the region through the training of local workers and collaboration with local institutions.
Contribution to economic development	<p>This project is an example of the entrepreneurial capacities that are being concentrated in Cádiz. TEDCOM invested nearly 3.5 million euros in this project, which made it possible to build an industrial plant in the Tecnobahía Park, Cádiz, to produce elements for the aeronautical sector, and specifically to meet manufacturing needs for the Airbus A320 aircraft. The project was developed in the region of Andalucía, where this type of technology had not been implemented before. In addition, TEDCOM generated employment for the development of a production plant, creating its own production facilities and growing a powerful productive capacity. Even though the initial target was having 9 workers, the company was able to create 22 jobs. Currently, since the level of production is lower, TEDCOM employs 20 workers.</p>
Contribution to social development	<p>This project has allowed TEDCOM to implement new manufacturing technologies in Andalucía with the most modern production means. The project has transferred the knowledge and technical capacity to a group of Andalusian workers. The company trained the workers during more than a year at its work centre in Vitora (Basque Member State) before starting its activities in Andalucía. 80% of the workers are local employees with extensive prior education who have been able to settle in the region, which will help in the promotion of further development and innovation activities in the province.</p>
Contribution to environmental development	<p>The project did not have any focus on environmental activities or environmental development.</p>
Innovation and potential for technological spin-offs	<p>Innovation is a central aspect in this project. TEDCOM developed an innovation project consisting in the elaboration of a more efficient manufacturing technique for the aeronautical sector and implemented it in Cádiz, where this technology was not previously available. The managing authority emphasised how the company was able to anchor knowledge to the region and was highly involved with local workers and local institutions, which will boost the innovation and development sector in Andalucía.</p> <p>Even though the project is completed, the company is still working on further developments of its new manufacturing techniques to implement them in other collaborations with Airbus Defence. In addition, the new Andalusian Aerospace Strategy 2027 will continue to fund dual use and defence related projects due to its innovative and international character.</p>

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Contribution to EU objectives	<p>The Managing Authority stressed the increasing importance of the dual use and defence sector in the European Union. The European Commission has identified aerospace and defence as Strategic Industrial Ecosystems for the continent. The project was aligned both with the EU objectives and regional development strategy since it involved the creation of a new high-tech and innovative SME with significant capacity to create quality employment in the region of implementation.</p> <p>This project contributes to TO3 on the enhancement of the competitiveness of SMEs. More precisely, it was financed through the investment priority 3.4 supporting the capacity of SMEs to grow in regional, national and international market, and to engage in innovation processes. TEDCOM has also contributed to the Specialisation Priority 2 of the RIS3 Andalucía about Advanced Industry linked to Transport.</p>
Transferability	<p>The innovative manufacturing techniques developed by TEDCOM under this project could be replicated by other companies and applied to different fields. RTM techniques are relatively recent developments which can serve the needs of aerospace and defence, electrical and electronic sectors, automotive engineering or construction. Also, as stated above, TEDCOM is trying to improve its RTM technique to manufacture more complex pieces to be used in future projects.</p>
Additional information / sources	<p>Sources:</p> <ul style="list-style-type: none"> – <i>Junta de Andalucía: Consejería de Transformación Económica, Industria, Conocimiento y Universidades (link)</i> – <i>Interview with 2 members of IDEA Agency</i> – <i>Interview with TEDCOM</i>

Project fiche 15– AeroSpace Cornwall	
Basic information	
Project title	AeroSpace Cornwall
Member State	United Kingdom
Fund	ERDF
Total project amount	€ 10,885,323
EU co-financing rate	65% (€ 7,133,345)
Thematic Objective	TO 1 “Strengthening research, technological development and innovation”
Lead partner(s)	
Lead partner	Cornwall Development Company Ltd
Legal identity	Company
Other partner(s)	-
Final beneficiary(ies)	Local and regional SMEs and companies working on supply chains relating to space and aerospace
Activity	
Project theme	Innovation, research and technological development
Project overview	<p>AeroSpace Cornwall (2017-2019), is a funding vehicle that promotes research, development and innovation (RD&I) across Cornwall (UK) in the space and aerospace sectors and supply chains.</p> <p>Cornwall is a region with significant space and aerospace potential (given the existence of an ex-military airport and Goonhilly Earth Station). At the same time, the economy has suffered from significant deindustrialisation in recent decades and is heavily dependent on tourism (which account for 40% of GDP), with many barriers to innovation. Barriers include a lack of awareness of the benefits of investing in innovation and of lack of access to appropriate finance.</p> <p>The objective of the project was to increase levels of RD&I across the business base of Cornwall and the Isles of Scilly to deliver aerospace and space sector cluster growth through targeted activities in critical areas of supply chain and cluster competitiveness. Further, the project aimed to build on the knowledge base by stimulating more productive interactions between small and medium-sized businesses and universities, research centres, large companies and other organisations. Practically, AeroSpace Cornwall offers technical and commercial support for businesses across Cornwall and the Isles of Scilly who are developing new products, services and technologies which could add value to the space and aerospace sectors.</p> <p>Aerospace Cornwall was renewed for the years 2019-2022 to continue to support regional businesses and SMEs within the same scope of the first phase of the project.</p>
Range of activities	<ul style="list-style-type: none"> – Understanding the market: Support dealing with potential customers, suppliers and experts to guarantee the viability of the product. – Developing the product: Provision of R&D funding for aerospace and space projects to accelerate product and service development. Productivity improvement

Project fiche 15– AeroSpace Cornwall	
	<p>programmes designed to increase the competitiveness of local businesses and create new supply chain opportunities.</p> <ul style="list-style-type: none"> – Unlocking the market: Facilitating advice from experts and attending events and trade exhibitions. <p>The programme works extensively with the Cornwall Manufacturers Group and Software Cornwall, the two main business communities</p>
Extent to which the project is dual use or defence related	<p>Although AeroSpace Cornwall does not have an explicit defence remit, it collaborates with a range of businesses that are very relevant to the defence supply chain and have developed products or services that can supply the aerospace and space sectors. These include manufacturing and advancing engineering, AI technology and machine learning, satellite data and software. Specifically, the project areas of focus include advanced engineering in aerospace, unmanned aerial systems (UAS), digital technologies such as embedded software and software applications using satellite communications, earth observation, navigation and meteorology.</p>
About the call	<p>The ERDF England Operational Programme 2014-2020 is split across nine priorities, one of which is Promoting Research and Innovation. AeroSpace Cornwall project was funded under the Priority Axis 1 of the ERDF (Research and innovation) and the category of intervention “Research and innovation processes in SMEs”. This PA1 Call was focused on inviting applications for projects delivering in the Smart Specialisation sectors for Cornwall and the Isles of Scilly, of which one is Space & AeroSpace.</p>
ESIF good practice features	<ul style="list-style-type: none"> – Strong coherence with the regional RIS3 strategy which emphasises taking advantage of the region’s space and aerospace potential – Increase the performance and competitiveness of local enterprises, create highly skilled jobs and launch new products into the marketplace. – It has worked in synergy with other projects in the region to leverage private sector match and acted as a catalyst for additional investment across the region (not measured as private match). – Develop the ‘innovation ecosystem’ for the space and aerospace clusters by incentivising local businesses to collaborate with other businesses and research institutions to accelerate their innovation. – Increase the value and capability of the local space and aerospace clusters and secure ongoing investment in them.
Project outputs	<p>More specifically, AeroSpace Cornwall supported and promoted the development of the aerospace cluster in the region of Cornwall. The following are some examples of projects developed under the funding of AeroSpace Cornwall:</p> <ul style="list-style-type: none"> – A partnership of three Cornish companies (Flann Microwave, Teddington Systems and Goonhilly Earth Station Ltd) obtained funding to develop miniaturised components for tiny communications satellites (e.g. nanosatellites and CubeSats). This project has created 14 new jobs in the region, as well as improved its aerospace manufacturing sector. – PV3 Technologies, an electrochemical company, used funding from AeroSpace Cornwall to start operating in the aerospace sector through innovations about fuel cell-powered UAVs.

Project fiche 15– AeroSpace Cornwall	
	<ul style="list-style-type: none"> – The start-up Greenwall will developed a tool to analyse asbestos content in structures in real time, enabling fast decision that could affect public health and safety
Project results	<ul style="list-style-type: none"> – Helped businesses that do not associate themselves with the aerospace/space supply chains identify opportunities to participate actively and add value to this sector (35 of the 51 supported companies did not identify as aerospace/space supply chain businesses) – Encouraged vertical and horizontal collaboration in the cluster through facilitated introductions – Promoted the capability of the cluster to national and international audiences – positively influenced the perception of inward investors who value access to the market, assets and collaborators, – New business to CloS have some of the greatest potential for job creation and GVA and v) provided opportunities for businesses to exploit the growth in the cluster and investment in CloS (such as Spaceport Cornwall).
Contribution to economic development	<p>Overall, AeroSpace Cornwall contributed to improving the competitiveness of the regional aerospace and space industry and supply chains, with a particular focus on support for the development and innovation of SMEs working in the sector in the region.</p> <p>AeroSpace Cornwall also supported inward investors by awarding soft landing packages and investment incentives, encouraging collaboration with other businesses across Cornwall and the Isles of Scilly.</p> <p>More specifically, based on an overall project cost of £4.78 million, it is estimated that AeroSpace Cornwall will generate a return on investment of £2.35 net additional GVA for every £1 invested.. When only the ERDF match is considered, return on investment by the AeroSpace Cornwall is estimated to be £3.47 net additional GVA for every £1 invested,</p>
Contribution to social development	<p>To date, it is estimated that AeroSpace Cornwall has supported the creation of 16 gross / 17 net additional jobs and contributed around £1.1m gross / £0.4 million net additional (GVA). Anticipated impacts over the next three years are estimated to be 67 net additional jobs and over £10 million net additional GVA (excluding inward investors) and a total potential of £10.1m - £36.8m net additional GVA, and between 67-414 net additional jobs. The project has changed perceptions about the emerging cluster across CloS providing a positive social impact relating to people's career ambitions and raising aspirations. The local workforce developed their R&I capability and in a small number of cases highly skilled labour has been attracted to the region.</p>
Contribution to environmental development	<p>The project had no environmental goals.</p>
Innovation and potential for technological spin-offs	<p>The idea behind AeroSpace Cornwall was not entirely innovative (i.e. providing support to businesses and SMEs) however an innovative element was the fact of linking the dots between actors and providing market insight on the topics of product development as well as exploitation.</p>
Contribution to EU objectives	<p>Clear contribution to Europe2020 goals of research and development and contribution to EU cohesion objectives (TO1).</p>

Project fiche 15– AeroSpace Cornwall	
Transferability	The project is highly transferable as there was nothing geographically specific about the creation of a support system for regional businesses and SMEs. However, such projects can be considered as particularly useful in Member States with a centralised government but with little representation of that government in more remote regions (i.e. which are further away and have less access and knowledge to promote their activities)
Additional information / sources	<p>Sources:</p> <ul style="list-style-type: none"> – <i>Interview with beneficiary project manager</i> – <i>Interview with Cornwall and Isles of Scilly MA</i> – <i>AeroSpace Cornwall (link)</i> – <i>Cornwall and the Isles of Scilly Growth Programme (link)</i> – <i>Project Evaluation and Summative Assessment Services for AeroSpace Cornwall (link)</i> – <i>Case Studies: Support and promotion of aerospace and space cluster development in Cornwall (link)</i> – <i>A Guide to European Regional Development Fund (ERDF) and European Social Fund (ESF) 2014-2020 Programmes in England (link)</i>

Project fiche 16– Development of a remote-controlled vehicle for operation in extreme CBRNE conditions	
Basic information	
Project title	Development of a remote-controlled vehicle for operation in extreme CBRNE conditions (DUV - NRKBE) - Razvoj daljinski upravljano vozila za djelovanje u ekstremnim NRKBE uvjetima (DUV - NRKBE)
Member State	Croatia
Fund	ERDF
Total project amount	€ 2,176,394
EU co-financing rate	85% (€ 1,178,299)
Contribution to Thematic Objective	TO 1 "Strengthening research, technological development and innovation"
Lead partner(s)	
Lead partner	DOK-ING d.o.o.
Legal identity of promoter / lead partner	Private company
Other partner(s)	University of Zagreb, Faculty of Electrical Engineering and Computing
Final beneficiary(ies)	Private companies, governments
Activity	
Project theme	Innovation, Research and technological development, Scientific cooperation, SMEs
Project overview	The goal of the project is to develop a vehicle for extreme Chemical, Biological, Radiological, Nuclear, and Explosives (CBRNE) conditions. The project started in 10/2017 and is scheduled for completion at the end of 05/2021. It is implemented under Priority axis 1 (Research and development) of Operational Program "Competitiveness and Cohesion 2014-2020" by the Croatian defence and security company DOK-ING.
Range of activities	The project envisages the development of a Remotely Controlled System for Operation in Extreme CBRNE Conditions (RCV-CBRNE) and its enhancement with capabilities such as autonomous patrolling and laser cartography. The following aspects are within the scope of this project: <ul style="list-style-type: none"> - Hybrid drive; - Broad range of cameras and sensory CRNE devices; - LIDAR technology and GPS; - Sampling system, fire and CBR decontamination system; - Front and rear tool attachments equipped for situational awareness.
Extent to which project is dual use or defence related	The project is classified as defence related as it is implemented by a defence stakeholder and entails the development of a vehicle, which allows for the following mission profiles to be undertaken: <ul style="list-style-type: none"> - Condition insight, search, CBR reconnaissance, monitoring, sampling and real-time data collection, processing and data distribution to higher command structures; - Removal of obstacles on the path of intervention, extinguishing fires and putting down toxic clouds; - Vertical and horizontal decontamination and removal of hazardous substances and objects; - Operations in an oxygen-free atmosphere and with high temperatures;

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	<ul style="list-style-type: none"> - Operating the vehicle from a distance of up to 1.5 km from a mobile or stationary operations centre. <p>At the same time, the RCV CBRNE is a system that can help both the civil protection and the military CBRNE defence system by addressing the consequences of the use of weapons and technological CBRNE accidents.</p>
About the call	<p>The call for R&D investments was designed according to thematic priority areas connected to the Croatian Smart Specialisation Strategy. One of the identified areas was security, with a sub-thematic area: defence dual use technologies and products. This R&D funding call followed the standard national rules and procedures for ESI funding with a specific set of indicators that had to be met and evaluated in project application and implementation. The project was designed to match the priorities of the sub-thematic area and complied with the following characteristics of the call:</p> <ul style="list-style-type: none"> - Contribution to addressing key societal challenges: Secure societies (Strengthening Europe's resilience to crises and natural and technological disasters, the fight against crime and terrorism); and Energy consumption; - Development of a new product on the global market as a result of research, development and innovation; - Increase in income from sales of a new product as a result of research and development activities.
ESIF good practice features	
ESIF good practice features	<p>Three elements make this project a good practice: high-end technology, strategic compliance, and company-university cooperation. As mentioned, the project will result in a new product, which combines innovative technologies for military and civilian use, e.g. hybrid drive and LIDAR technology. This resulted in a very high score under the appraisal procedure of the call (94 out of 100 points). Furthermore, the project has the status of PNI (Project of National Interest) awarded to it by the Croatian Defence Industry Cluster.</p> <p>The defence sector was involved in the process of designing Croatia's smart specialisation thematic areas and in developing the call through public consultations. The involvement of stakeholders and clear communication among the stakeholders induced a higher level of ownership of the strategy, and it made sure that the call could be relevant for defence stakeholders. This is a good practice, which allowed the RCV-CBRNE project to materialise. Furthermore, the project application was built with consideration of the strategic framework:</p> <ul style="list-style-type: none"> - NATO's acknowledgement of the dangers of the use of CBRN weapons, but also the dangers of emissions of Toxic Industrial Materials from technological plants and warehouses in deployment zones because the mentioned threats affect the deployment of forces, degrade personnel and equipment and jeopardise the execution of tasks⁵²; - Aware of the dangers of CBRN threats and all the complexities that such threats create, both the EU and NATO define cooperation in defence against CBRN threats under the Solidarity Clause⁵³.

⁵² Allied Joint Doctrine for CBRN Defence AJP-3.8 (a), Edition a Aerison 1, 2012

⁵³ EU Preparedness against CBRN Weapons; Policy Department for External Relations, DG for External Policies of the Union, PE 603.875, 2019, Action Plan to enhance preparedness against CBRN security risks, 2017, COM, 610 final, and Decision no. 1313/2013 / EU EUP and the Council of 17 December 2013 on the Union Mechanism for Civil Defence emphasizes concerns about CBRN threats and through Modules 12 and 13 Civil Defence Union

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	<p>Furthermore, there is synergetic cooperation on the project between a defence company and a university. For example, the Faculty of Electrical Engineering and Computing (FER) conducts a challenging/risky part of research in the development of software management and autonomous functions for which it has relevant experts that DOK-ING does not currently have.</p>
Project Outputs	<p>The output of this project is the development of a system that allows remote control of a vehicle operating in CBRNE conditions. Specifically, the following outputs are expected:</p> <ul style="list-style-type: none"> - A prototype platform with an integrated chassis and independent suspension, an electric part of a hybrid diesel-electric drive, a part of a hydraulic and electric servo system and a part of a decontamination and self-decontamination system; - A prototype superstructure with integrated manipulator arm, integrated data collection and processing system and event prediction using video and thermal cameras, sensors and detectors, sampling system, fire extinguishing system, decontamination and self-decontamination system; - An integrated autonomy system; - A functional unit that is optimised, standardised, and tested with elaborated tactics of use and logistical needs; - Application for an industrial design and patent protection in the EU and the US; - Dissemination of the outputs to the scientific community and the general public.
Project results	<p>The project will result in a remotely operated system, which will allow removal of hazardous objects, investigation, scanning, monitoring, collecting and processing data, enabling prediction of events, sampling and marking a hazardous zone, putting out fires, performing CBRNE decontamination and neutralising or removing explosive devices. Beyond the application of the tool, the project will contribute to strengthening the link between the private business and academia via increased R&D investment of DOK-ING (the project leader) and the Faculty of Electrical Engineering and Computing (acting as project partner).</p>
Contribution to economic development	<p>The project creates conditions for employment at the local level. Linked to the project:</p> <ul style="list-style-type: none"> - The DOK-ING company should hire 3 new employees by 2023; - The Faculty of Electrical Engineering and Computing (FER) will employ 4 new employees - a junior researcher, two researchers and one experienced researcher. <p>In the longer-term, the aspiration of the project is to contribute to employment and economic development through commercialisation of the product.</p>
Contribution to social development	<p>The project is not expected to have a significant contribution to social development, but as mentioned, it will increase the capacity of the University of Zagreb and the link between the defence companies in Croatia (through the Croatian Defence Industry Cluster) and the academic sector are likely to be strengthened.</p>
Contribution to environmental development	<p>The vehicle will speed up the intervention time in critical situation and will reduce the impact of CBRNE accidents on people and the environment. Furthermore, the technology itself is more environmentally friendly as compared to non-hybrid alternatives.</p>
Innovation and potential for technological spin-offs	<p>The project will transfer knowledge and technology from the fields of KET and ICT technology, as well as modern technologies of robotic sampling to the armed forces, police, fire departments, civil defence, and the civil sector. In this project DOK-ING subcontracted and outsourced several R&D and production activities to well-established, as well as highly skilled start-up companies. This allowed the company to grow their supply chain across the EU, as</p>

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	well as to boost partnerships with local companies. The main spill-over effects however are related to new applications of the results of this project. This project should affect multiple sectors and applications, where such technology could be used to change mission modules without significant burden to non-reoccurring engineering. The main spill-over is expected in several industries such as defence, security, and the energy sector.
Contribution to EU objectives	Overall, the project contributes to several EU objectives. Firstly, the project meets the requirements of the European Strategy for Smart, Sustainable and Inclusive Growth - Europe 2020. Secondly, it contributes to addressing key societal challenges in line with the Horizon 2020 Strategy: <ul style="list-style-type: none"> - The application of results in the field of safety and dual application of special purpose machines will provide new insights both in the field of fire safety and in the field of safety related to CBRNE technology; - Part of the project is also based on research in ICT as an enabling and industrial technology with the aim of achieving excellence and leadership at the global level.
Transferability	Similar projects for the development of high-tech vehicles with defence and civil protection purposes can be financed by EU-financed innovation schemes in other Member States. As concerns the project results, the system and vehicle can be potentially used by military, environmental protection agencies, offshore companies, educational institutions for several purposes and in different geographical areas. The project leader is involved in the PESCO SaaS Project initiative called The Chemical, Biological, Radiological and Nuclear Surveillance as a Service (CBRN SaaS) as a terrestrial platform in the project, showcasing that the RCV-CBRN is already recognised on EU level.
Additional information / sources	Sources: <ul style="list-style-type: none"> - <i>Interview with Managing Authority – Ministry of Regional Development and EU Funds, with contributions from Ministry of Economy and Sustainable Development and HAMAG BICRO - Intermediate Body Level 1 and 2</i> - <i>Project information (link)</i> - <i>Company website (link)</i>

Project fiche 17– Creation of an international centre of excellence in naval digital systems	
Basic information	
Project title	Creation of an international centre of excellence in naval digital systems
Member State	France
Fund	ERDF
Total project amount	€ 12,225,173
EU co-financing rate	49.6% (€ 6,062,881)
Contribution to Thematic Objective	TO 1 “Strengthening research, technological development and innovation”
Lead partner(s)	
Lead partner contact details	Naval Group (former DCNS) https://www.naval-group.com/en_communication@naval-group.com
Legal identity of promoter / lead partner	Company
Other partner(s)	-
Final beneficiary(ies)	Naval Group
Activity	
Project theme	Construction and renovation; Innovation, Research and technological development
Project overview	<p>The project consisted of the construction of a new building for DCNS (renamed Naval Group since). Naval group is a leading naval defence system company, covering a range of services and products related to maritime defence, as well as marine renewable energy solutions. The construction allowed for the expansion of its activities and the development of new products with significant added value and innovative potential.</p> <p>The construction took place in the Technopôle de la Mer (The Marine Techno Park) cluster, launched in 2014. The cluster focuses on maritime security and sustainable development. It aims to provide an optimal growth environment for high-tech activities (e.g. business incubators, business and research centres, innovative enterprises, etc).</p>
Range of activities	<ul style="list-style-type: none"> - Construction of the building - Research activities in the domains of maritime defence, security and renewable energy solutions
Extent to which project is dual use or defence related	<p>This is a defence related project. The lead partner of the project, DCNS/Naval Group, is a defence stakeholder. Moreover, as intended, the Ollioules site is involved in maritime defence and security projects. An example of this is the COMPASS2020 maritime surveillance project, also benefitting from EU funding.</p> <p>The Technopôle de la Mer (The Marine Techno Park) cluster, within which the new DCNS/Naval group building is located, also has a clear defence angle with several running projects related to maritime defence and security.</p>
About the Call	No information available
ESIF good practice features	<ul style="list-style-type: none"> - The creation of a technological cluster in maritime technologies provides added value for research and innovation and opens up opportunities for growth and technological spin-

Project fiche 17– Creation of an international centre of excellence in naval digital systems	
	<p>offs. The large number of projects in different areas (50 funded in defence and security alone) proves the effectiveness of this setup.</p> <ul style="list-style-type: none"> - The project contributes significantly to creating new high-skilled employment and job opportunities, with Naval group employing more than 1300 people in its Ollioules site. - Technopôle de la Mer is one of the ten (10) major operations of the “Toulon Grand Projet Rade”, thus contributing to local development strategies. It also makes a clear contribution to EU research objectives.
Project Outputs	The building constructed is a 30 000 m ² service industry complex and hosts more than 1 300 employees. DCNS/Naval group was one of the first movers to the technology cluster at Ollioules, but many larger companies and SMEs have followed suit since.
Project results	The creation of the cluster, of which this project forms part, has led to hundreds of collaborative projects being initiated and funded, with 50 in defence and security alone. Therefore, the initial goal of expanding the capacity of Naval group and developing new products has been achieved.
Contribution to economic development	The Ollioules site of Naval group hosts more than 1 300 employees, and around 400 of them are estimated to be newly created jobs after the construction of the new facility. The staff cover around 50 different professions.
Contribution to social development	The site hosts many high-skilled jobs. The Technology park contributes to local strategies, as well as the development of the Toulon metropolitan area, which is one of the most important economic centres in the region.
Contribution to environmental development	<p>The project had no explicit environmental goals. Nonetheless, Naval Group’s solutions related to marine renewable energy, and the technology cluster at the Technopôle de la Mer are explicitly focusing on sustainable maritime development. An example of such a Naval Group project where the Ollioules site is involved, is the project IMPALA, focusing Ocean Thermal Energy Conversion.</p> <p>The building constructed follows the highest environmental standards. For instance, solar protection system and solar heating panels (covering 50% of the hot water needs of the locker rooms) have been installed, and vegetation has been planted on the roofs. The buildings have been awarded the NF HQE Bâtiments Tertiaires, a French standard certifying that the facilities use the best available environmental technology.</p>
Innovation and potential for technological spin-offs	The spaces and services offered at the Technopôle de la Mer are dedicated to hosting and developing innovative enterprises, labs and education centres. This creates an environment that encourages innovation and collaboration across the value chain related to the work of Naval group. Through its research and development work, there is a high innovative and technological spin-off potential thanks to this project. This goes beyond defence related applications, and can have a wider impact in areas covered by the Technopôle de la Mer, for instance digitalisation, renewable energy or environmental protection. The AGESIC project provides an example of the latter, where Naval Group cooperates with other members of the techno park.
Contribution to EU objectives	The project makes a clear contribution to the Europe 2020 goals of research and development, as well as climate change and energy through devoted research projects. It is also aligned with ESIF objectives.
Transferability	Contributing to the development of a cluster focusing on R&I is easily replicable. However, the presence of strong defence players on the market is a prerequisite if the cluster is to focus on defence and security-related research and development activities.

Project fiche 17– Creation of an international centre of excellence in naval digital systems

Additional information
/ sources

Sources :

- *EP & Région Provence-Alpes-Côte d'Azur – https://www.europarl.europa.eu/france/resource/static/files/bureau-marseille/europe-concret/projets_soutenus_par_des_financements_europeens_en_region_provence-alpes-cotes_d_azur-avril-2017.pdf*
- *Toulon Provence Méditerranée – <https://metropoletpm.fr/actualites/dcms-a-rentree-a-ollioules>*
- *Toulon Provence Méditerranée - The Toulon Metropolitan Community Committed to the Future – <https://en.metropoletpm.fr/sites/en.tpm-agglo.fr/files/brochureeco2011.pdf>*
- *Toulon Provence Méditerranée – <https://metropoletpm.fr/entreprises/article/-innovation-coeur-de-mediterranee>*
- *La gazette du Var – <http://lagazetteduvar.fr/a-la-une/inauguration-du-site-dcms-d-ollioules.html>*
- *COMPASS2020 – <https://www.compass2020-project.eu/#1345378834>*
- *Naval Group Financial Report 2016*
- *Naval Group Yearbook 2019*
- *EIB – JESSICA evaluation study
https://www.eib.org/attachments/documents/jessica_evaluation_study_provence_alpes_cote_dazur_region_en.pdf*

Project fiche 18- Marine Area Surveillance System using Unmanned Aircraft Systems (U.A.S.) to prevent and prevent piracy on merchant ships

Basic information	
Project title	Marine Area Surveillance System using Unmanned Aircraft Systems (U.A.S.) to prevent and prevent piracy on merchant ships
Member State	Greece
Fund	ERDF
Total project amount	€ 754,082
EU co-financing rate	80% (€ 603,265.6)
Contribution to Thematic Objective	TO 1 "Strengthening research, technological development and innovation"
Lead partner(s)	
Lead partner	AS PROTE MARITIME LTD
Legal identity of promoter / lead partner	Company
Other partner(s)	University of Aegean, The Department of Oceanography and Marine Life Sciences (TOTHB)
Final beneficiary(ies)	Maritime and transport companies as well as security companies
Activity	
Project theme	Innovation, Research and technological development
Project overview	<p>This project envisages the development of two different types of unmanned aerial surveillance systems (SMEAs). The first SMEA will be fully equipped with sensors (and other recording instruments) in order to review, record, process data and identify various unknown "targets" in marine areas. The purpose of this is to avoid and prevent piracy in commercial ships. The customised "smart systems" for recording and reading data based on the combined use of sensors and ground control systems is the key differentiator from existing unmanned systems.</p> <p>The second SMEA system that will be developed is a small, flexible and easy-to-use system for non-specialised operators. More specifically, in the event that the ship is occupied by pirates it will allow for tracking of the ship, at an appropriate height and distance, for the first significant period of the ongoing piracy, retransmitting at appropriate frequencies alarm signal (S.O.S.) as well as crucial ship information. In particular, following the ship, in addition to transmitting the distress signal (S.O.S), it will transmit the ship's position, and a picture of the situation prevailing in vulnerable parts of the ship through a network of micro-cameras installed on the ship's bridge, the escape room, etc.</p> <p>The project started in July 2020 and is expected to end by the end of 2021.</p>
Range of activities	<p>The project area of focus includes the development of unmanned aerial surveillance systems (U.A.S.) for maritime use, specifically, the development of sensors and other recording instruments. The project activities include:</p> <ul style="list-style-type: none"> - Identification of the phenomenon of piracy in modern times - Determination of the operational specifications of the SMEA system under construction as well as the methodological approach for its construction - Determination of the technical specifications of the SMIEA system, definition of the methodological approach and design of the new system under construction

Project fiche 18- Marine Area Surveillance System using Unmanned Aircraft Systems (U.A.S.) to prevent and prevent piracy on merchant ships	
	<ul style="list-style-type: none"> - Development of SMIEA system, development of mechanisms and infrastructures for interconnection of sensors for monitoring the marine environment. - Optimisation of mechanisms and infrastructures for the interconnection of marine space monitoring sensors - Participation in an International Maritime Exhibition
Extent to which project is dual use or defence related	This project is considered dual use because as the project outputs can be used in multiple sectors and by different actors. The company implementing the project has foreseen the possibility to produce several versions of the two drones used for the unmanned aerial system (U.A.S.). They will have different prices and technology level. Highest quality drones are destined to the defence and military domain while other versions will be sold to private companies.
About the call	The funding for this project was obtained through the European Regional Development Fund (ERDF) for the period 2014-2020. Specifically, through the Single RTDI State Aid Action "RESEARCH - CREATE - INNOVATE" support measure funded by the Operational Programme Competitiveness, Entrepreneurship and Innovation 2014-2020 (EPAnEK). The call was a general one aiming at financing innovative projects and did not include any reference to defence related or dual use projects.
ESIF good practice features	<p>The following elements make the project a good practice:</p> <ul style="list-style-type: none"> - The development of unmanned surveillance systems that will provide the possibility of better surveillance of marine areas makes this project relevant for defence related activities. - This project could not have been implemented through purely national-level measures; thus, it shows E.U. added value. - Technological breakthroughs and innovation in unmanned aerial surveillance can be replicated in other Member States and serve more than just the maritime sector.
Project outputs	The main outputs of the project are the two unmanned aerial surveillance systems. The systems aim to tackle the need for continuous security services on merchant ships that sail through areas where pirate groups operate, ensuring thereby the safe movement of people and goods.
Project results	<p>A direct result of the project will be the reduction of risk but also the cost of providing armed and unarmed protection services on merchant ships as well as the decrease in insurance costs for crews, ships and cargo.</p> <p>In addition, the economic consequences of piracy in the maritime community are significant as they pose costs to states that have to tackle this phenomenon. Therefore, the expected impact of this project concerns security for the marine endeavours but also the competitiveness of companies and research agencies dealing with the phenomenon of piracy, as it will build on the results of this project, i.e., the provision of modern security services at national, European and global level. The results extend beyond just tackling the piracy problem and are also expected to be significant in complementary sectors or activities, such as:</p> <ul style="list-style-type: none"> - Search and rescue at sea - Security of naval targets - Maritime area surveillance

Project fiche 18- Marine Area Surveillance System using Unmanned Aircraft Systems (U.A.S.) to prevent and prevent piracy on merchant ships	
	<ul style="list-style-type: none"> - Coverage of “dead sectors” of maritime and coastal telecommunications using a frequency transponder - Marine hazard diagnosis - Prevention of maritime accidents
Contribution to economic development	The project contributes to the competitiveness of security companies and research institutions by offering an innovative system that will provide modern security services/products both nationally and globally. Additionally, such innovation is expected to lead to highly-skilled job creation as the systems should allow for a shift from physically securing cargo and merchant ships to remote controlling. The economic development is expected as a consequence of the reduction of economic losses of the Member States adjacent to areas of pirate activity, Member States with developed tourist traffic or Member States with large fish stocks.
Contribution to social development	Avoiding cases of kidnappings, hostage-taking and even crew deaths can be considered as improving social conditions as it impacts people's safety.
Contribution to environmental development	Unmanned aircraft systems could potentially be used for environmental protection purposes (such as surveillance of actors causing pollution of protected areas).
Innovation and potential for technological spin-offs	As a research project and building on the collaboration of a specialised maritime company with the maritime department of the University of Aegean, this project provides grounds for technological spin-offs.
Contribution to E.U. objectives	This project makes a clear contribution to the Europe 2020 goals of research and development as it focuses on the development of new technologies. It is also aligned with one of the ESIF Thematic Objectives (TO 1).
Transferability	The Unmanned Aircraft Systems (U.A.S.) developed as part of this project are appealing to governments not just at E.U. level as they reduce the monitoring costs in interim safety information and save time. Given that research work related to this project is dependent on the equipment (facilities, hardware and software) rather than the involvement of defence stakeholders, it can be easily replicated on the condition that the technological contribution of the project is deemed significant. As the project focuses on maritime surveillance, access to sea can be considered a prerequisite.
Additional information / sources	<p>Sources:</p> <ul style="list-style-type: none"> - <i>Marine Remote Sensing Group</i> (link) - <i>Project website</i> (link) - <i>Operational Programme Competitiveness, Entrepreneurship and Innovation 2014-2020 (EPAnEK)</i> (link) - <i>Interview (questionnaire) with the beneficiary</i>

Project fiche 19 – Research and development of a multi-purpose 3D radar prototype	
Basic information	
Project title	Research and development of a multi-purpose 3D radar prototype
Member State	Hungary
Fund	ERDF
Total project amount	€ 2,556,376
EU co-financing rate	56% (€ 1,428,784.7)
Contribution to Thematic Objective	TO 1 “Strengthening research, technological development and innovation”
Lead partner(s)	
Lead partner	PRO PATRIA ELECTRONICS Mérnöki Fejlesztő és Szolgáltató Kft
Legal identity of promoter / lead partner	Company
Other partner(s)	DatGolf Mérnöki Szolgáltató és Távközlési Kft.
Final beneficiary(ies)	PRO PATRIA ELECTRONICS Mérnöki Fejlesztő és Szolgáltató Kft; DatGolf Mérnöki Szolgáltató és Távközlési Kft.;
Activity	
Project theme	Innovation, Research and technological development
Project overview	<p>The aim of the project is to produce a 3D radar capable of detecting drones from a distance that allows for the necessary protective or countermeasures to be taken. With easily controllable and relatively cheap drones becoming ever more widespread, ensuring a detection capability to control for potential threats has become essential. The new prototype serves both civilian and military purposes. It had three main goals:</p> <ul style="list-style-type: none"> - The creation of a multi-beam 3D radar prototype - Increase of the capacity of the lead company - Contribute to increasing the revenues of the company, mainly through export activities
Range of activities	<p>The project included the following activities:</p> <ul style="list-style-type: none"> - Preparation of the technical specifications for the prototype - Development of components based on the technical specifications <ul style="list-style-type: none"> o In the case of hardware components: manufacturing and testing o In case of software: testing - Integration of components - Identifying and resolving issues arising during the integration - System test
Extent to which project is dual use or defence related	The lead partner is a defence stakeholder and member of the defence industry association of Hungary. The project content offers dual use potential, as its price and adherence to CE marking standards make it available for instance to the police or border patrol. However, the content has a clearly defence related angle, as the prototype was also designed to meet military requirements.
About the call	The project was funded through the Competitive Central-Hungary Operational Programme (VEKOP), under the 1 st call for the priority “Support of business RDI activities (VEKOP 2.1.1-15)”. The call targeted projects supporting the in-house development of new, marketable products, services, and technologies with significant intellectual added value by knowledge-

Project fiche 19 – Research and development of a multi-purpose 3D radar prototype	
	intensive, innovative businesses. It targeted non-research enterprises. Pro Patria Electronics was already planning to roll out a radar with the ability to detect drones also accessible for civilian purposes. The project envisaged fit the requirements of the call.
ESIF good practice features	<p>The project exhibits good practice features, including:</p> <ul style="list-style-type: none"> - It supports innovation, and thus the creation of new growth opportunities - It creates new high-skilled employment opportunities - Contributes to the development of the Hungarian defence industry - It is in line with the priorities of the National Smart Specialisation Strategy (notably 'Smart Production'), as well as the "Zrínyi 2026" military modernisation and rearmament programme of the Hungarian government. The latter intends to revitalise Hungary's military industry both to supply the Hungarian Defence Forces and to produce weapons and equipment for export.
Project Outputs	<p>The project had the following outputs:</p> <ul style="list-style-type: none"> - 3D multi-beam drone detection radar - An algorithm capable of detecting targets with low signal-to-noise ratio, and allowing for target identification distinguishing between at least the following targets: drone, bird, helicopter, propeller plane, as well as ground and air targets - Algorithm compensating for the reduction of detection capability caused by stationary targets
Project results	The project developed a radar prototype capable of detecting drones at a price sufficiently cheap to be accessible to non-military stakeholders, while capable of performing up to the standard of more expensive military-grade devices. This allows for the civilian (and security) sector to benefit from increased detection capabilities up to the challenges posed by new technologies.
Contribution to economic development	<p>The project allowed the company to develop technologies with high export potential. While the third goal of the project (i.e. increase in export revenue until 2024) is still in progress, the figures from recent years have already shown an increase in company revenue mostly due to successful export activities.</p> <p>The lead company is an important player in the Hungarian defence industry. The support provided ensures their competitiveness and allows for the further development of the sector and the creation of new high-skilled job opportunities.</p>
Contribution to social development	The second objective of the project contributed to social development and was also achieved. Pro Patria hired 11 new employees (marking a 20 percentage point increase in the previously employed workforce). The new positions are all high-skilled jobs, including engineers, physicists, mathematicians and specialised software developers.
Contribution to environmental development	The project has no environmental development goals.
Innovation and potential for technological spin-offs	<p>The technology developed is innovative, especially considering that:</p> <ul style="list-style-type: none"> - The multi-beam 3D radar developed offers full coverage and identification potential falling within its scope

Project fiche 19 – Research and development of a multi-purpose 3D radar prototype	
	<ul style="list-style-type: none"> - It also makes it possible to monitor vertical movements through the use of 16 channels - The algorithm developed enables the detection of small, slow-moving objects, filtering out noise <p>The innovative nature of the project makes it competitive on the international market.</p>
Contribution to EU objectives	The project contributes to the Europe 2020 goals of research and development, as well as ESIF goals (TO 1 and Cohesion Policy more generally).
Transferability	The project is easily replicable. The support provided is to a defence stakeholder working on technology development applicable to both the military and civilian sector. Nonetheless, there is a need to ensure the availability of sufficient know-how for such an R&I project.
Additional information / sources	<p>Sources:</p> <ul style="list-style-type: none"> - <i>Interview with project beneficiary</i> - <i>VEKOP call information (link)</i> - <i>VEKOP pályázat kommuniké (link)</i> - <i>Pro Patria Electronics website (link)</i> - <i>Támogatott projekt kereső (link)</i>

Project fiche 20– Cyber Conflict Simulator	
Basic information	
Project title	Cyber Conflict Simulator
Member State	Croatia
Fund	ERDF
Total project amount	€ 528,815
EU co-financing rate	80% (€ 424,418)
Contribution to Thematic Objective	TO 1 “Strengthening research, technological development and innovation”
Lead partner(s)	
Lead partner	Utilis d.o.o.
Legal identity of promoter / lead partner	Company
Other partner(s)	Faculty of Electrical Engineering and Computing, University of Zagreb
Final beneficiary(ies)	Utilis d.o.o.; Faculty of Electrical Engineering and Computing, University of Zagreb
Activity	
Project theme	Innovation, Research and technological development
Project overview	<p>The objective of the project was to build a simulator for conducting cybersecurity exercises. The project aims to train cybersecurity incident handlers (executive staff and managers) to deal with cyber-attacks in an effective and efficient manner by training them in a simulated landscape where cyber-attacks are enacted in a realistic way.</p> <p>The project started in January 2018 and will be end in March 2021 (all project activities will be finalised by the end of 2020 followed by required audit/revision procedures). The lead partner of the project, Utilis d.o.o., is an SME, cooperating with the Faculty of Electrical Engineering and Computing of the University of Zagreb. Utilis d.o.o. forms part of the CybersecRDI cluster, aiming to help companies to improve their cybersecurity offer.</p>
Range of activities	<p>The two main project research streams focus on simulating attackers and developing the cyber landscape. The main activities include:</p> <ul style="list-style-type: none"> - Researching a simulation model and application system simulating different cyber-attacks for education and training. - Provision of business and education and skills development support
Extent to which project is dual use or defence related	This is a defence related project. The lead partner, Utilis d.o.o. is a member of the Croatian defence industry competitiveness cluster. While the product can be used for defence related purposes, it is mainly intended for civilian purposes. The potential users identified of the project are the financial industry, the ICT, energy, transportation, and defence sectors, as well as any sector of national strategic importance (e.g. health).
About the call	Prior to ESIF financing, the project received funds for technical assistance activities under the 2015 call of the EDA – “Supporting dual use technology projects for access to European Structural and Investment Funds co-financing”. The project was co-financed from the by the ERDF under the Operational programme competitiveness and cohesion 2014 – 2020, supporting the Smart Specialisation Strategy of the Republic of Croatia. The R&D call for proposals was intended for micro, small, medium and large enterprises with a view to

Project fiche 20– Cyber Conflict Simulator	
	supporting the development of new products (goods and services) in relation to one or more R&D topics. One of the identified areas was security, which included Dual use Technologies and Products for Defence as its sub-thematic area.
ESIF good practice features	<p>The project has several good practice features:</p> <ul style="list-style-type: none"> - The project is easily transferable; - It establishes cooperation between the private sector and academia; - Provides further employment opportunities in high value-added industries (e.g. ICT); - It drives innovation and helps participants in ensuring their competitive position on the market; - The project provides a direct contribution to Croatian national strategies, namely: <ul style="list-style-type: none"> - The project contributes to the security priority of the Croatian Smart Specialisation Strategy 2016-2020. Specifically, to thematic priority area 4. Security, Sub-thematic priority area 4.2. Defence technologies and dual use products. Having defence and dual use technologies explicitly mentioned in the Smart Specialisation Strategy enabled the realisation of this project. In addition, the defence cluster (including manufacturers and SMEs) is supporting the inclusion of the same thematic objective (Security and Defence) as part of the National Development Strategy 2020-2030 as a continuation of good results in this area for the 2021 – 2027 outlook; - The project is also in line with the National Cyber Security Strategy of the Republic of Croatia. It contributes to the objective F.4, “Improving the way protected information is handled by entities responsible for protected information, protected information processors and authorised users of protected information”; - The project showcases EU added value as it would not have been materialised without the support of EU funding (80%, while the remaining 20% provided by the beneficiary and project partner).
Project Outputs	Project outputs include the establishment of infrastructure, design and definition of architecture systems, prototype objects and model elements, the development of simulation objects, the construction of a distributed simulator, the implementation of synthetic behaviours and the development of advanced simulation logic, as well as prototype testing.
Project results	The project was successful in developing the cyber conflict simulator (CCS), a software which mimics cyber-attacks, thus creating a realistic environment in which incident managers can be trained. In this way, the CCS allows for hands-on practice in dealing with aggression and incidents that complement theoretical knowledge. The result is a product for the training of executive-level individuals that are responsible of executive decisions during cyber-attacks and related incidents.
Contribution to economic development	The project creates employment opportunities for highly educated staff in cybersecurity by providing further opportunities to employ experts in high value-added industries. The commercialisation will primarily target users (institutions) of national importance (support for critical infrastructures - energy, transport, health), financial institutions and private companies with significant impact on the national economy, thus extending the impact beyond the

Project fiche 20– Cyber Conflict Simulator	
	cybersecurity sector. Providing employment opportunities in high value-added industries could slow down the brain drain of high skilled workers.
Contribution to social development	The project had no social development goals.
Contribution to environmental development	The project had no environmental development goals.
Innovation and potential for technological spin-offs	<p>This research project has clear potential for technological spin-offs, especially in the area of education against cybersecurity threats. It was based on effective cooperation between the scientific institution and the private sector, offering a clear case of knowledge transfer between the two. Additionally, the implementation of project activities related to machine learning stimulated knowledge build up and allowed the beneficiary to extend their offer and market potential thus creating conditions for further innovative work (situation-specific simulators extending beyond cybersecurity).</p> <p>The CCS is an export product intended for the global market as it is relevant for any sector where cyberattacks can occur. It will enhance both the competitive position of the company developing and producing it, as well as the cybersecurity response effectiveness for the stakeholders benefitting from such training having the potential even of setting up new processes in the way companies/institutions deal with incidents given that it targets executive staff (managerial level).</p>
Contribution to EU objectives	The project contributes to two of the five Europe 2020 strategy goals, namely education and innovation. It is also in line with the Digital Agenda for Europe and the Innovation Union policy.
Transferability	The project is easily transferable and could be replicated elsewhere. Any Member State that has in place a national strategy concerning cybersecurity would benefit from the CCS. Nonetheless, it requires the presence of a strong player in the cybersecurity field. The work of the Croatian defence cluster and specific actors at the Faculty of Electrical Engineering and Computing enabled the successful realisation of this project showing that collaboration among different stakeholders can be an enabling factor for success stories.
Additional information / sources	<p>Sources:</p> <ul style="list-style-type: none"> - Croatian Ministry of Regional Development and EU Funds – Managing Authority - Utilis d.o.o. - Beneficiary - EDA website (Link) - S3 platform, CybersecRDI (link) - University of Zagreb website (link) - Utilis d.o.o. website project description (link) - Croatian Smart Specialisation Strategy 2016-2020 (link) - National Cyber Security Strategy of the Republic of Croatia (link)

Annex B – Case studies on Smart Specialisation Strategies

As described in section 3.1.2 regional and national RIS3 strategies were examined to identify links with dual use and defence related activities to support the analysis. The following sections focus on three case studies that showed links with dual use and defence related activities in order to gain a more in-depth understanding how the RIS3 strategies and priorities materialised into projects identified.

Case study: Croatia

Rationale for the selection of the case study

In its smart specialisation strategy, Croatia put security as a priority area in the Member State's RIS3 strategy. The priority covers cyber security, defence dual use, and data mining action programme. In addition, Croatia has a growing defence related industry, which has been an important factor in the creation of a competitiveness cluster for defence. In the analysis above, Croatia has been identified as one of five regions with smart specialisation strategies that explicitly refer to defence.

Smart Specialisation Strategy

Croatia's Smart Specialisation Strategy outlines five priorities with specific measures designed to increase the competitiveness of thematic and sub-thematic priority areas by promoting RDI activities and investment. Formal cooperation structures are established in the form of competitiveness clusters based on the Triple Helix model, which identifies industrial sectors with common interests and potential synergies. Of the 13 competitiveness clusters formed in Croatia, one is explicitly related to the defence industry.⁵⁴ The cluster includes private companies, business clusters and science and research organisations, and is a member of the ENDR.

Overall, the defence sector constitutes an important element of Croatia's smart specialisation strategy. In 2014, the Croatian Ministry of Economy supported competitiveness clusters in the form of HRK 100,000 (13,500 euros) per cluster. The support was aimed at the preparation of sectoral analyses, strategic guidelines, sectoral mapping and promotion. A second round of cluster funding was implemented in 2015 based on a performance analysis. This performance analysis considered the performance and track record of the cluster. Competitiveness cluster initiatives contribute directly to strategic objective 4 of the Croatian Smart specialisation strategy (upgrading the global value chain and promoting the internationalisation of the Croatian economy). In such a perspective, companies offering dual use technologies contribute strongly to Croatia's economic, social and environmental development.

The defence industry in Croatia

The mission of the competitiveness cluster for the defence industry is to boost Croatia's security and competitiveness potential by investing in new emerging technologies and innovative solutions in the defence sector. The main products of the Croatian defence sector include guns and pistols, military

⁵⁴ Croatian competitiveness clusters (CCCs) were established by the Ministry of Economy in 2012 to link private and public enterprises, science and research institutions, governmental bodies and intermediary organisations to enhance competitiveness and innovation in specific sectors of the Croatian economy. Available at: <https://hrcak.srce.hr/file/307207>

helmets, demining machines, naval vessels, protective clothing and equipment, development and production of complex rocket systems. Several companies offer technical solutions such as systems for detection of mines and unexploded ordnance, design of ICT security systems, development of autonomous underwater vehicles - diving (dual use), development of software solutions in integration with unmanned aircraft in the field of protection and rescue, development of autonomous surface vehicles. Finally, the research activities cover testing, development and training in the field of mine action, photonics and nanotechnology. The competitiveness cluster for the defence industry is comprised of 38 private sector companies and business clusters, the Croatian Employers' Association, the Croatian Chamber of Economy, the Zagreb Innovation Centre and 10 science and research organisations.⁵⁵ In 2015, the Croatian defence industry cluster supported stakeholders assisted the industry in preparing responses to the Call for proposals "Supporting dual use technology projects for access to European Structural and Investment Funds co-financing". This resulted in an increased number of applicants (nine project proposals sent to the EDA in 2015, as compared to only one in 2014). Two projects from Croatia (only six project proposals were envisaged to be supported from the whole EU) were granted technical support from EDA to prepare their dual use projects.

Alignment of RIS3 strategies with projects identified

The mapping identified 23 defence related projects and 12 dual use projects. This is striking because as shown in chapter 4.2 generally more dual use projects have been identified than defence related projects. On the other hand, this indicates that the RIS3 priority does promote projects within the defence dimension.

Six dual use projects are linked to the RIS3 priority Energy and Sustainable Environment, where none of the scientific domains or policy objectives have been identified as dual use.

Another dual use project which falls into the RIS3 priority of Transport and Mobility as it is a project which invests in research activities, developing and testing of an integrated system for dynamic positioning of ships. This priority has not been identified as dual use either.

One dual use project is linked to the policy objective E.39 - Industrial biotechnology, which has been identified as relevant to dual use above. The project aimed at designing new nanostructured materials for biosensors and biomedicine.

Two dual use projects fit the RIS3 priority Security as they are AI and machine learning projects aimed at developing AI technologies and researching industrial machine learning. The projects are linked to the policy objective D.20 - Big data, data mining, database management, Another one can be linked to the policy objective D.29 - ICT trust, cyber security & network security within the Croatian Security priority as it concerns the overall development of a new platform of advanced microprocessor embedded systems for regulation, protection and control in power systems. One dual use project aimed at expanding high-tech products and services for the satellite and space industries can be linked to the scientific domain 04.27 - Telecommunication systems.

Three defence related projects are linked to the RIS3 priority Energy and Sustainable Environment. They are classified as defence related because they benefitted defence stakeholders, more specific defence companies. The remaining 20 projects are all linked to the RIS3 priority Security. The projects include projects concerning:

⁵⁵ <https://eng.hkkoi.hr/index.php/membership/>

- Remote-controlled vehicle for operation in extreme CBRNe conditions
- Development of a multifunctional anti-terrorist system
- Research infrastructure of the Laboratory for Underwater Systems and Technologies
- Internationalization of products and businesses
- Advanced Methods and Technologies in Data Science and Cooperative Systems
- Improving the company's position on the market
- The application of standards together with a reliable technological solution that will contribute to the activities of the defence company
- Increasing the competitiveness, export, and production capacities of companies
- Investment in an integrated application software solution and information system for making cuts to optimize business processes and increase the efficiency of the defence company
- Increasing the production capacity and volume of the companies
- Development of a multifunctional safety helmet
- Development of a simulator that will allow education and training of cyber security experts

Case study: Campania, Italy

Rationale for the selection of the case study

In its smart specialisation strategy, Campania put new technologies and process management for the aerospace industry as a priority area in the region's RIS3 strategy. Within this area the policy objective of safety and security in aeronautics and space explicitly references dual use/ defence. In the analysis above, Campania has been identified as one of five regions with smart specialisation strategies that explicitly refer to defence.

Smart Specialisation Strategy

Campania's Smart Specialisation Strategy outlines six priorities with specific measures designed to increase the competitiveness of thematic and sub-thematic priority areas. Of the competitiveness clusters formed in Campania, one is explicitly related to the defence industry and dual use. The Campania Aerospace Technological District (DAC) is part of the European Network of Defence related Regions. The cluster includes large companies, SMEs and research organisations.

The aerospace sector represents a key element of Campania's smart specialisation strategy building on the birth of the regional aerospace cluster in 2012 that was established to favour the development of competitive capabilities within the Campania aerospace industry. This network helps the region in implementing the RIS3 priority and enhancing the position of the Campania aerospace sector.

The defence industry in Campania

The Italian government has designated new regional growth areas as technology districts and has established guidelines to foster economic and scientific growth and competition at the local level. Campania is one of Italy's current and planned technology districts devoted to defence with a focus on polymer-based materials and structures research and development. Campania region is home to aerospace, defence and a variety of electronics industries. The main activities of the Campania's defence sector include the assembly of primary aerostructures, the assembly of complete fuselages,

making machined parts for aircrafts, c the fabrication of metal sheets for aircrafts, the assembly of panels for aircrafts, the production of light alloy castings for helicopters, naval radar systems, electromechanical and electronic parts, repairs and manufacturing of microelectronics assemblies, software and hardware solutions designed and developed for naval and land systems and for air traffic control. Furthermore, together with universities and research centres dual use projects are implemented in fields such as seismology, optoelectronics, imaging and underwater archaeology. Within the RIS3 priorities there is a regional focus on aerospace. The biggest defence employer in the region is the aerospace division of Leonardo in Pomigliano d'Arco. Furthermore, Leonardo Group is very strong in Campania also in the electronics, defence and security systems sectors (in Bacoli, Giugliano and Pozzuoli). However, the only defence related regional association is the Campania Aerospace Technological District. Currently, DAC involves 159 direct and indirect partners, including 22 large companies, 18 research centres and 109 SMEs. This makes the DAC the national cluster with the largest number of members and the highest capitalisation. The top 30 companies with almost 9.500 employees and a turnover of 2 billion EUR, represent a quarter of the national aerospace industry. In 2018, the Regional aerospace sector invested 12% of the whole budget to R&D activities.

Alignment of RIS3 strategies with projects identified

The mapping identified 8 defence related projects and 17 dual use projects. This makes Campania the region, in which the most dual use projects have been identified. Compared to the Croatian case study this could be the case as the RIS3 priority is linked to defence but the focus is on aerospace, not on security which led to a significant number of dual use aerospace projects in the region of Campania.

Almost all projects identified could be linked to the priorities identified as being relevant to defence and/ or dual use.

One dual use project on the modelling framework oriented focused on the simulation of traffic and mobility falls into the RIS3 priority of new technologies and materials for efficient and sustainable logistics and mobility, which has not been identified as a priority linked to dual use. One defence related (study on new sustainable materials to substitute the regular ones normally used in the nautical sector) and one dual use project (on the creation of products and services to process data provided by earth observation satellites) were linked to the priority of new technologies for energy saving and environmental sustainability. The dual use project can be linked to the policy objective D.36 - Smart system integration, while the defence related project cannot be matched with a scientific domain or policy objective identified as dual use or defence related.

One defence related project on the improvement of the regional radio network to adequately respond and reduce risks in the area and five dual use projects can be assigned to the RIS3 priority of new materials and technologies for efficient and sustainable manufacturing. The defence related project and one dual use project are linked to the scientific domain 12.102 - Engineering Sciences, two dual use projects can be matched with the scientific domain 12.104 - Mathematics, computer and information sciences and the remaining two dual use projects fall into the policy objective E.38 - Advanced materials.

The RIS3 priority identified as being most relevant to defence is the priority on new technologies and process management for the aerospace industry. 12 dual use projects and 6 defence related projects can be attributed to it:

- Creation of a software prototype to manage all features of flight operations, maintenance and logistics (dual use)

- New application of the innovative space vehicle re-entry system (dual use)
- Development of a computing node, aimed at the development of a reliable and certifiable safety critical computing platform and a new methodology will be studied that will allow to increase the safety of the avionic control systems (dual use)
- Development of a device able to improve the efficiency of helicopter rotors during operation (dual use)
- System dedicated to infrastructure monitoring, capable of providing automatic warnings and alarms to stakeholders in the sector when a non-conforming deformation is detected. Information retrieved from UAVs (dual use)
- Improvement of Navigation performance of mini and micro drones (dual use)
- Development of a novel navigation system for unmanned aircraft (dual use)
- Development of a modular electromechanical drive platform for an electric aircraft (dual use)
- Technological developments to produce a structure that can be used as a space capsule carrier (dual use)
- Development of an application based on the Unmanned Aerial Vehicle system (dual use)
- Support pilots by ensuring continuity of service and showing them the relevant information through customized interfaces for each phase of flight (defence related)
- Use of innovative techniques for the verification of the structural components of space aircrafts (defence related)
- Define, design and build a modular iron bird (Mib) capable of testing the flight control equipment of different types of aircrafts (defence related)
- Offer institutional and private entities access to the Space with a short notice, at low costs and with the ability to recover a payload (defence related)
- Study of advanced configurations for the development of an innovative regional aircraft (defence related)
- Acquisition of material for the realization of low-pressure turbines and combustion chambers for aeronautical engines (defence related)

Case study: North Rhine-Westphalia, Germany

Rationale for the selection of the case study

In its smart specialisation strategy, North Rhine-Westphalia has four RIS3 priority areas linked to dual use in the region's RIS3 strategy. In addition, North Rhine Westphalia is home to a significant defence industry comprised of SMEs and large industry. Defence industry SMEs are organised in the Association of Security Technology Businesses in North Rhine-Westphalia which is part of the European Network of Defence related Regions.

Smart Specialisation Strategy

North Rhine-Westphalia's Smart Specialisation Strategy (Innovation strategy of the Land North Rhine-Westphalia) outlines eight priorities with specific measures aimed at promoting innovations in thematic priority areas. In this context, the 16 North Rhine-Westphalian state clusters have a fundamental role to play. The clusters and the regional networks initiated and supported by them are

the drivers for identifying future issues and developing market potentials to increase innovation dynamics. In this function they implement the eight priorities towards different lead markets. Their orientation towards cross-innovation makes it possible to focus the different sectors and fields of technology represented in the clusters on the topic-oriented priorities. The regional clusters corresponding to the RIS3 priorities linked to dual use are clusters on new materials, information and communication technologies, machine and plant engineering, and energy and environmental industry. Dual use or defence are neither explicitly mentioned within the clusters nor the RIS3 priorities. To what extent the priority areas linked to defence and dual use based on the policy objectives and scientific domains led to defence related/ dual use projects, will be outlined below.

The defence industry in North Rhine-Westphalia

The defence companies in North Rhine-Westphalia are organised in the national German Aerospace Industries Association (BDLI) and the Federal Association of the German Security and Defence Industry (BDSV). 30 companies from North Rhine-Westphalia are members of the BDLI and 20 companies with the headquarter in North Rhine-Westphalia are members of BDSV. The Association of Security Technology Businesses in North-Rhine-Westphalia (GSW NRW) is part of the European Network of Defence related Regions and the only defence related regional association. It has more than 70 members and is an SME-oriented organisation. Furthermore, the region is home to Thyssen Krupp and Rheinmetall two of the biggest defence companies in Germany with combined arms sales of 5.5 billion EUR.⁵⁶

Companies in the region include solutions and products such as campsite protection, target systems, range control systems, battle and sound effect simulators, IT security technology, CBRN reconnaissance systems, military vehicles, weapons, ammunition, fire protection in military vehicles, optoelectronics, tactical equipment, armoured glass, military aircraft simulators and military communication

Small enquiries in the Bundestag show 2014-2020 data individual licences per federal state for exports of military equipment. When it comes to number of individual licences as well as nominal and percentage value share of the region is across the board in the top 5 of defence exports, but well behind Bavaria and Baden-Württemberg.⁵⁷ The highest nominal value of exports of military equipment has been observed in 2017, when companies from North Rhine-Westphalia produced exposed military goods of the value of 1.39 billion EUR.

Alignment of RIS3 strategies with projects identified

In contrast to Campania and Croatia, in North Rhine-Westphalia there is no RIS3 priority explicitly linked to defence or dual use. The four identified RIS3 priorities in the region relevant to defence or dual use have been identified based on the scientific domains and policy objectives. Interestingly, in North Rhine-Westphalia 19 defence related projects have been funded by the ESF, while in Campania and Croatia all identified projects have been funded by ERDF. All the ESF projects in the region relate to either education, training or consulting. None of the ESF projects are associated with any of the RIS3 priority as the focus of the regional RIS3 is on innovation and more oriented towards ERDF.

Three projects have been identified being linked to the RIS3 priorities of Mobility and logistics (dual use) and Energy and environmental industry (two defence related projects), respectively, which are not relevant to dual use.

⁵⁶ https://www.sipri.org/sites/default/files/2019-12/1912_fs_top_100_2018_0.pdf

⁵⁷ <http://dipbt.bundestag.de/dip21/btd/19/009/1900984.pdf>; <https://dipbt.bundestag.de/doc/btd/19/103/1910392.pdf>;
<http://dip21.bundestag.de/dip21/btd/19/172/1917272.pdf>; <https://dip21.bundestag.de/dip21/btd/19/210/1921017.pdf>

One defence related project is on the combination of electronically produced micro structured zinc coatings and nano structured zinc oxide top layers is related to the RIS3 priority of new materials and the policy objective E.38 - Advanced materials identified as connected to dual use. Another defence related project on the development of a technology processor for adaptive manufacturing can be matched with the RIS3 priority of Machine and plant engineering. The relevant scientific domain for dual use is 06.39 - Improving industrial production and technology.

Two defence related projects and one dual use project are linked to the RIS3 priority of information and communication technologies. The defence related projects are on innovative and precise code analysis tool that helps to detect security holes in software automatically and a software for autonomous control of robots in the power electronics segment and the dual use project is about a transport satellite for small rockets is being developed here to transport small satellites far beyond the range of the micro launcher. The relevant scientific domains are 12.104 - Mathematics, computer and information sciences and 04.27 - Telecommunication systems and the policy objective linked to dual use is D.35 - Robotics, autonomous and cyber physical systems.

Annex C - List of defence related regions with no identified projects

<u>Member State</u>	<u>NUTS 2 Region with no identified projects</u>
Austria	[AT13] Wien
Belgium [BE]	[AT32] Salzburg
	[BE10] Région de Bruxelles Capitale/Brussels Hoofdstedelijk; Gewest
	[BE22] Prov. Limburg
	[BE23] Prov. Oost-Vlaanderen
	[BE31] Prov. Brabant wallon
	[BE34] Prov. Luxembourg
	[BE35] Prov. Namur
Germany	[DE12] Karlsruhe
	[DE13] Freiburg
	[DE21] Oberbayern
	[DE22] Niederbayern
	[DE23] Oberpfalz
	[DE24] Oberfranken
	[DE25] Mittelfranken
	[DE27] Schwaben
	[DE60] Hamburg
	[DE72] Gießen
	[DE92] Hannover
	[DEA1] Düsseldorf
	[DEA2] Köln
	[DEA3] Münster
	[DEA4] Detmold
[DEA5] Arnsberg	
[DEC0] Saarland	
[DED5] Leipzig	
Greece	[EL53] West Macedonia

	[EL54] Continent
	[EL62] Ionian Islands
Spain	[ES11] Galicia
	[ES22] Comunidad Foral de Navarra
	[ES23] La Rioja
	[ES41] Castilla y León
	[ES42] Castilla-la Mancha
	[ES51] Cataluña
	[ES62] Región de Murcia
	[ES63] Ciudad Autónoma de Ceuta
	[ES64] Ciudad Autónoma de Melilla
Finland	[FI1B] Helsinki-Uusimaa
	[FI1C] Etelä-Suomi
	[FI1D] Pohjois- ja Itä-Suomi
	[FI20] Åland
France	[FRD1] Basse-Normandie
	[FRE1] Nord-Pas-de-Calais
	[FRE2] Picardie
	[FRI3] Poitou-Charentes
	[FRY5] Mayotte
Hungary	[HU12] Pest
	[HU21] Közép-Dunántúl
	[HU22] Nyugat-Dunántúl
Italy	[ITC2] Valle d'Aosta/Vallée d'Aoste
	[ITF2] Molise
	[ITF6] Calabria
	[ITH2] Provincia Autonoma di Trento
Netherlands	[NL12] Friesland
	[NL13] Drenthe
	[NL21] Overijssel
	[NL23] Flevoland
	[NL32] Noord-Holland
	[NL34] Zeeland
Poland	[PL21] Małopolskie

	[PL22] Śląskie
	[PL41] Wielkopolskie
	[PL42] Zachodniopomorskie
	[PL43] Lubuskie
	[PL52] Opolskie
	[P61] Kujawsko-pomorskie
	[PL62] Warmińsko-mazurskie
	[PL71] Łódzkie
	[PL72] Świętokrzyskie
	[PL81] Lubelskie
	[PL84] Podlaskie
	[PL91] Warszawski stołeczny
Portugal	[PT15] Algarve
	[PT17] Área Metropolitana de Lisboa
	[PT20] Região Autónoma dos Açores
Romania	[RO11] Nord-Vest
	[RO21] Nord-Est
	[RO22] Sud-Est
	[RO31] Sud-Muntenia
	[RO32] București-Ilfov
	[RO42] Vest
Sweden	[SE12] Östra Mellansverige
	[SE21] Småland med öarna
	[SE31] Norra Mellansverige
	[SE32] Mellersta Norrland
United Kingdom	[UKC1] Tees Valley and Durham
	[UKC2] Northumberland and Tyne and Wear
	[UKD1] Cumbria
	[UKD3] Greater Manchester
	[UKD4] Lancashire
	[UKD6] Cheshire
	[UKE1] East Yorkshire and Northern Lincolnshire
	[UKE2] North Yorkshire
	[UKE4] West Yorkshire

[UKF1] Derbyshire and Nottinghamshire
[UKF3] Lincolnshire
[UKG2] Shropshire and Staffordshire
[UKH1] East Anglia
[UKH3] Essex
[UKI3] Inner London-West
[UKI4] Inner London-East
[UKI5] Outer London-East and North East
[UKI6] Outer London-South
[UKI7] Outer London-West and North West
[UKJ2] Surrey, East and West Sussex
[UKJ3] Hampshire and Isle of Wight
[UKJ4] Kent
[UKK1] Gloucestershire, Wiltshire and Bristol/ Bath area
[UKK2] Dorset and Somerset
[UKK4] Devon
[UKM5] North Eastern Scotland
[UKM6] Highlands and Islands
[UKM7] Eastern Scotland
[UKM8] West Central Scotland
[UKM9] Southern Scotland

Annex D - Challenges encountered and lessons learnt from a methodological point of view

Various challenges were encountered during the identification of the dual use/defence related projects (Part 1 of the Study).

- A common/generic challenge was the different structures of the files that contained information on the ESIF supported projects across Member States. In some cases, the data files contained very detailed description of the project objective, activities and expected results which made it easy to identify the project and to label it as a dual use of defence related. However, in other cases, the available data file with list of supported projects contained very limited description on the activities and the expected results. In this regard, many databases had only short project summaries, which complicated the decision-making process to exclude or include the projects. This was especially the case for most ESF databases.
- A more specific challenge stemming from the different structure and content of the data files was the information on lead partners, project partners and beneficiaries. In some cases, the data file identified only the lead partner even if there were multiple project partners/beneficiaries. Those challenges were addressed by consulting the webpages of the lead partner and/or the project (if such page existed) to verify the information on the project and to extend it, if necessary.
- Another challenge encountered during the identification of the project characteristics was the information on the actual funding, where the databases employed different approaches as well. In some cases the database offered information on the total budget of the project and the EU contribution, but in other cases it was only on the EU contribution. An additional challenge faced was when a number of databases had information on the total budget of the project and identified the EU financing as a share of the total budget. In those cases the EU contribution to a project was calculated using the available information (the sum of the total budget of the project is multiplied by the identified share of EU funding to get the sum provided by ESIF).

For the elaboration of good practices (Part 2 of the Study), the biggest challenge was the different levels of information available through desk research, which was very diverse across the cases. For some of them, there was a wealth of information available, including project applications, details of the call for tenders, specific goals and results achieved, etc. For others, the information online was only sufficient to cover the basic details. Overall, while the level of data available to prepare the case studies varies largely, it was ensured that all case studies benefit from sufficient detail to showcase the contribution of these projects to regional development. In all cases, desk research was complemented by interviews with the relevant Managing Authorities and/or project beneficiaries.

From all the above considerations on the methodology and approach implemented in order to carry out the research, which has enabled the elaboration of the Study, some lessons learnt can be outlined from a methodological perspective:

- There exists a big disparity in public databases. Not all Managing Authorities comply with requirements in the same way and not all publish the same information. This makes the aggregation of information sometimes quite challenging. In this sense, a larger degree of homogenisation of those ESIF-related databases created by Member States would be advisable.
- Concerning the above, Keep.eu could be considered a good practice, as the information from all European Territorial Cooperation Programmes/INTERREG is available in the same format, allowing for more efficient ways for analysis and assessment.
- Another of the lessons learnt related to the databases analysed comes from the fact that, with the exception of the aforementioned keep.eu, the rest of the databases consulted do not offer information disaggregated at a thematic objective level, so the analysis in this sense has had to be carried out in a purely qualitative manner. In this sense, for the next programming period, one lesson clearly derives from the convenience of linking the projects in the databases with the thematic objectives within which they fall.
- Similarly, the events section of the European Network of Defence Related regions⁵⁸ offers quite a comprehensive picture of conferences and workshops organised in this context, and the summaries and/or outlines of the conferences included in the actual website also offer very useful pointers and hints, together with specialised information on defence related and dual use matters (even in some cases from a regional perspective).

⁵⁸ <https://www.endr.eu/events>

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