



Vision on defence related skills in Europe today and tomorrow

Report summary
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The EDSP is financed by
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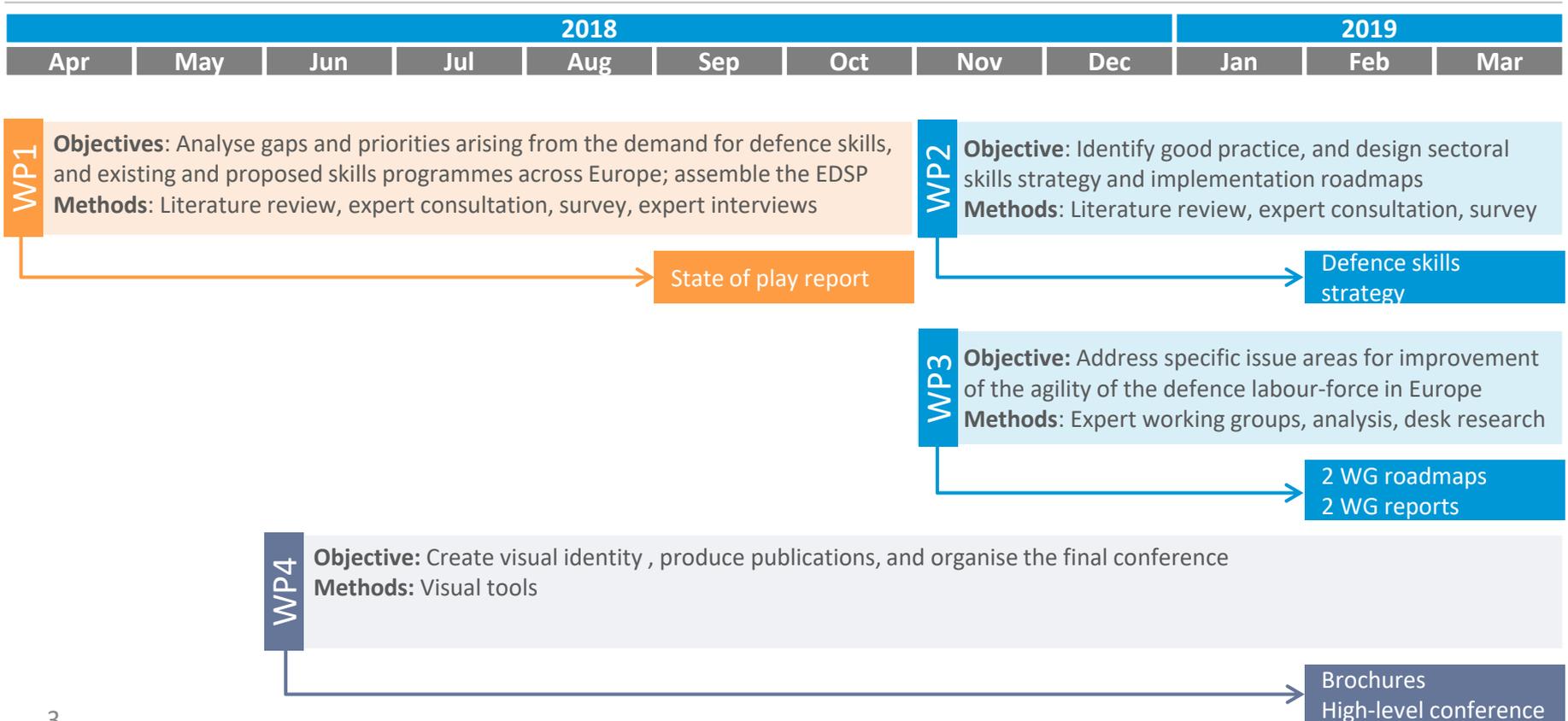
Introduction

Purpose of the project and the workshop

- The **aim of the project**, is to complete the evidence base on skills, introduce an industry-led European Defence Skills Partnership (EDSP) and deliver a sectoral skills strategy, agreed and validated by stakeholders
- The **EDSP** represents a cross section of the defence skills stakeholder community. During this project, it will provide input into the European skills strategy for the defence sector
- The **purpose of the report** is to understand defence-related skills availability, existing and potential skills mismatches and to map out the skills supply landscape in Europe in order to design pathways to address any identified mismatches in the next stage of the project

Project overview | Structure and deliverables

Timeline



Overview of the methods and scope of the report

Overview of research conducted to date



To date, the research team has **interviewed 51 stakeholders**

The survey received **81 responses**

Reviewed **17** EU-level policies and funding instruments and **475** defence related skills programmes and initiatives across a total of **16 EU countries**

Reviewed, where available, national defence strategies and defence industrial strategies

Drafted **10 indicative** country profiles (although scope of research is EU-wide)



Denmark



Finland



France



Germany



Italy



Netherlands



Poland



Spain



Sweden



UK

Structure of this presentation

The following presentation provides an overview of the report and key findings

1. Overview of skills demand – what skills are required in the EDTIB today and tomorrow?
2. Identified skills gaps and shortages – what skills are particularly difficult to source?
 - Technical cross-domain skills
 - Soft skills and skills relating to new technologies
 - Domain-specific skills
3. What factors drive skills mismatches?
4. What are the implications of skills mismatches on the EDTIB?
5. Skills supply landscape – mapping of the programmes, policies, and initiatives on defence-related skills
6. What are the implications of report findings for sectoral skills strategy development?

Overview of skills demand

What skills are required in the EDTIB today and tomorrow?

- The demand for skills is mainly driven by **defence equipment programmes** and **emerging technologies**
- Skills needed in the EDTIB now and in the future fall in two broad categories:
 - Skills that **enable the delivery of current and planned defence equipment programmes** (based on equipment lifecycle stage requirements, and domain specificities)
 - Skills that enable the EDTIB to **harness technological advances** and remain innovative and competitive (i.e. digital skills, data analytics, software design and engineering, autonomy, automation and cyber skills)
- The taxonomy of defence industry-related skills provides detailed occupations and skills areas for these two categories

Country	DTIB size			Skills demand						Identified skills gaps and shortages	
	Turnover bn € p/a	Employees	Main companies								Defence capabilities
 Denmark	0.4	3,000	Terma, Scandinavian Avionics, Systematic, Gomspace, Hydrema	✓			✓			Manufactures subcomponents and parts of weapon systems	Production planning, management and organisational skills for building manufacturing capacity & quality advanced manufacturing, electronics, and software
 Finland	1.4	6,100	Patria, Sako, Bittium	✓	✓			✓		Manufactures SALW, communications solutions	Operational and technical skills: engineering, cyber security and emerging technologies
 France	15	200,000	Airbus Group, Dassault Aviation, Nexter Group, Naval Group, MBDA, Thales, Safran Group	✓	✓	✓	✓	✓	✓	Manufactures aircraft, helicopters; submarines, naval vessels, weapons & missiles; space launch vehicles	Skills that are in short supply include engineering; digital including data management, cyber and AI, for which programs are only recently emerging; as well as operators and technicians
 Germany	30	100,000	Hensoldt, Airbus, Rheinmetall, KMW, ThyssenKrupp, Lürssen	✓	✓	✓		✓		Air defence systems: TLVS (2015), NNbS (2018); ground defence: LAND 400; other naval , cyber programmes	engineering positions, supply chain software design and engineering, and information architecture, and management for mission management and concept design, safety, advanced automation, digitalisation
 Italy	16	60,000	Leonardo, Fincantieri, Avio Aero, Beretta, Iveco Defense Vehicles	✓		✓		✓		Naval assets MBT, armoured infantry fighting vehicles; C4ISTAR systems, avionics, opto-electronics, electronic warfare, radar and sensors; helicopters, UAVs	Shortage of STEM graduate to support Industry 4.0 requirements Autonomy and unmanned system engineering, weapons design, electronic warfare and material engineering
 Netherland	4.5	24,800	Damen, Thales ND, FoxIT	Domain-agnostic sub-systems and components						ICT, sensors, software, simulations, electronics, containers, propulsion systems, missiles, weapons	Engineers with specialisms in mission systems, systems testing, advanced materials, synthetic environments, safety, advanced development, electrical, AI and autonomous systems, radar systems, mechanical and thermal.
 Poland	1	60,000	PGZ, Sikorsky/PZL Mielec, PZL-Swidnik, Shipbuilding Repair Shipyard Gdansk, TELDAT, Ultratech	✓			✓	✓		Armoured and artillery vehicles; small surface vessels; small arms; electronics, air defence systems, multipurpose helicopters, UAVs, naval vessels, submarines	Information architecture, systems engineering, mechanical and thermal engineering, systems test engineering, electrical and control engineering. Project managers with skills in marketing, safety, strategy building and knowledge of foreign markets
 Spain	5.7	210,000	Navantia, Indra, Airbus, General Dynamics European Land Systems	✓		✓				Manufactures aircraft, ships, ammunition and weapons; imports armoured vehicles	Cybersecurity skills shortages (e.g. in IT design)
 Sweden	2.9	63,000	Saab, BAE Systems, Volvo Defense, Kockums	✓	✓	✓				Combat air (Gripen); ELINT/SIGINT/AWACs aircraft; corvettes, conventional submarines; ground vehicles	Aerospace, avionics, underwater vehicles, mechanical, electrooptics, automation, control systems, radars, safety, arms integration, computational; software developers; managers; constructors, configurators, builders, mechanics, technicians and maintenance personnel.
 UK	25.6	265,000	BAE Systems, Rolls Royce, GKN, QinetiQ, Babcock, Cobham, MBDA	✓		✓			✓	Aerospace manufacturing; nuclear submarines , cyber, armoured vehicles, attack and transport helicopters, satellites	Advanced manufacturing, nanotechnology and quantum science Systems and software engineering, mechanical engineering and project management

Conceptualising skills mismatches

The report refers to skills gaps, shortages and mismatches

- **Skills shortages** - a “situation in the labour market where the demand for particular type of skills is higher than the supply of workers with that type of skill”
- **Skills gaps** - a “situation where the type of skills of people do not match the requirements of the job or the level of skills is less than the level required to perform the tasks associated with the job satisfactorily”
- **Skills mismatches** - a “situation of imbalance in which the level or type of skills available does not correspond to labour market needs”

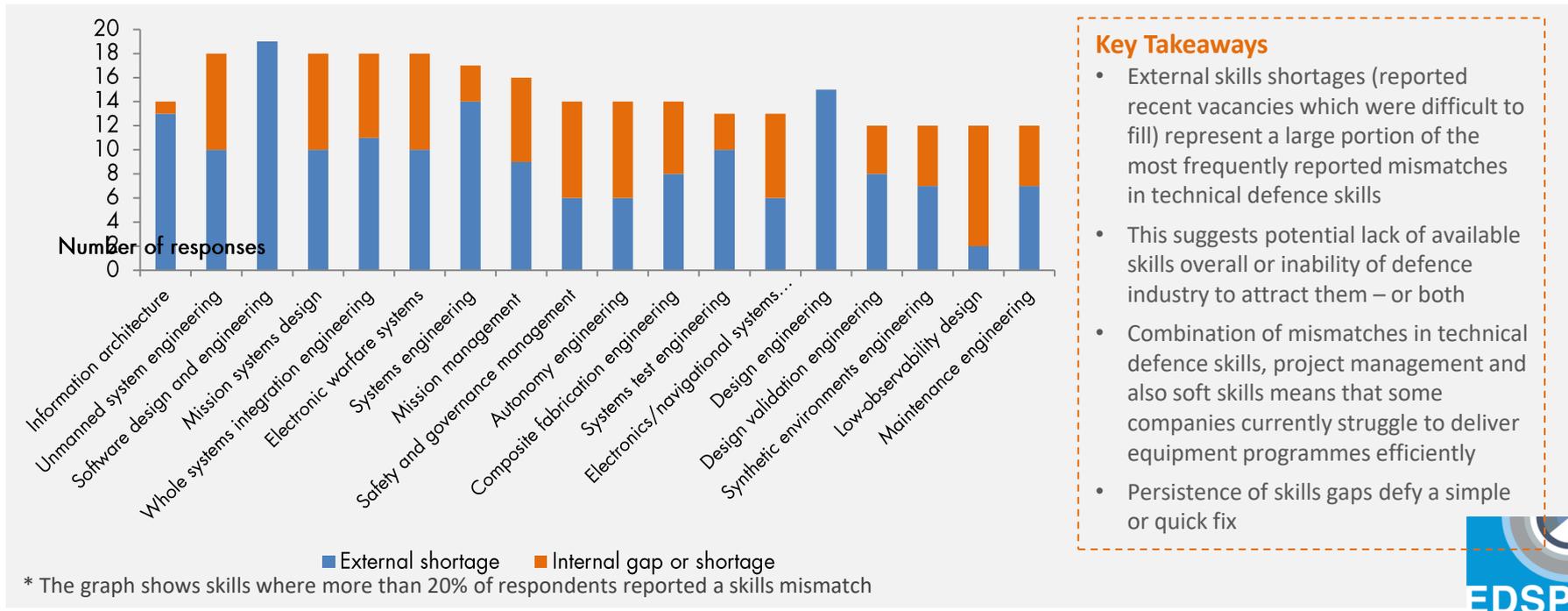
Main identified groups of skills mismatches

While a wide range of skills are in demand, some skills require particular attention

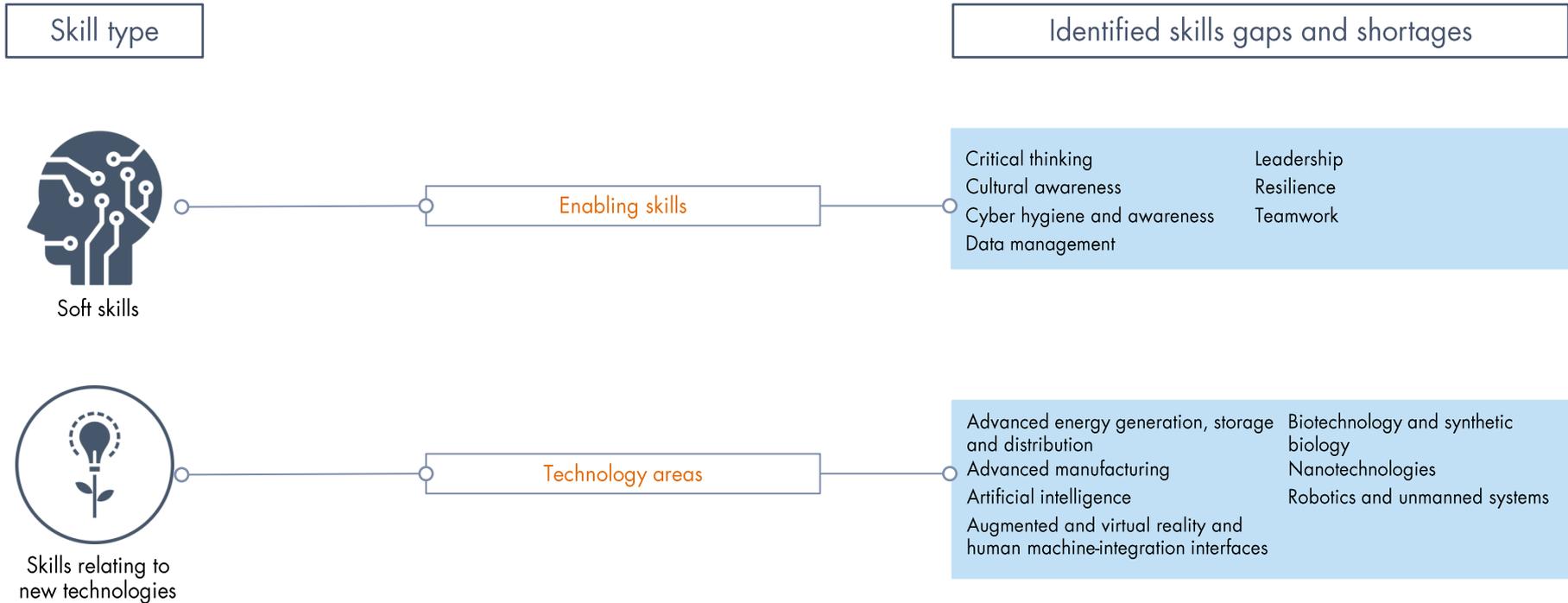
<p>STEM (science, technology, engineering, mathematics)</p>		<p>STEM skills gap arises due a high demand in professions like advanced manufacturing, artificial intelligence (AI), electronics, software engineering, radar system engineering and manufacturing cost management.</p>
<p>Cyber and ICT (information communication technologies)</p>		<p>Digital skills (e.g. software engineering and cybersecurity skills) are increasingly more difficult to source, as the integration of digital technologies in manufacturing processes and equipment designs may requires upskilling.</p>
<p>Management, marketing or sales skills</p>		<p>The countries with smaller defence industries often report a lack of experience and skills required in management and administration, marketing and sales positions.</p>
<p>Specialised and domain skills</p>		<p>This gap arises from the limited availability of a pool of potential candidates with the required skills and ageing populations across Europe, the level of interest in working for the defence industry</p>
<p>New skills</p>		<p>New and emerging technologies (e.g. AI, big data) shape both military capability and industrial process, driving the need for 'new' skills.</p>

Technical defence skills mismatches (cross-domain)

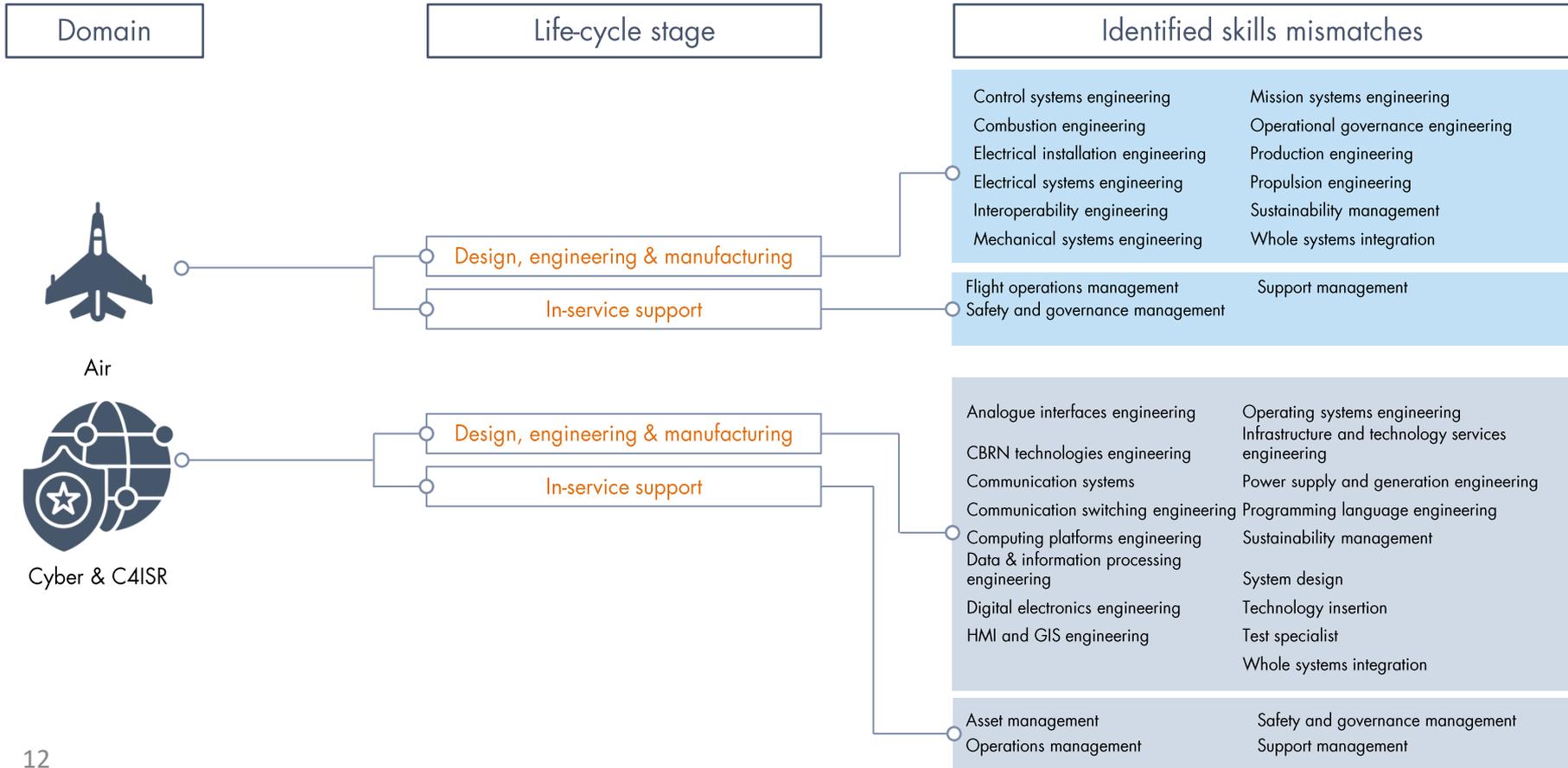
These are the top 18 identified cross-domain skills mismatches, reported by the survey



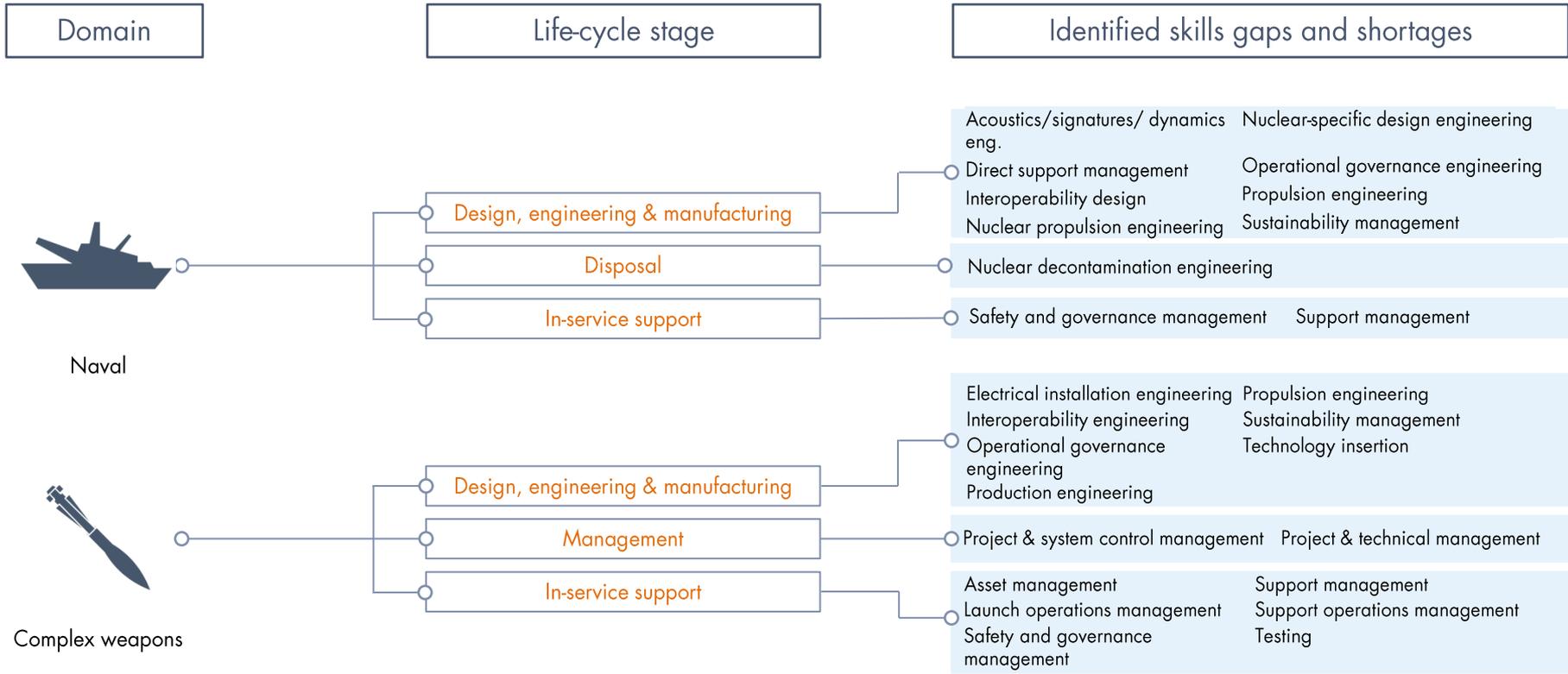
Soft skills and new technologies mismatches (cross-domain)



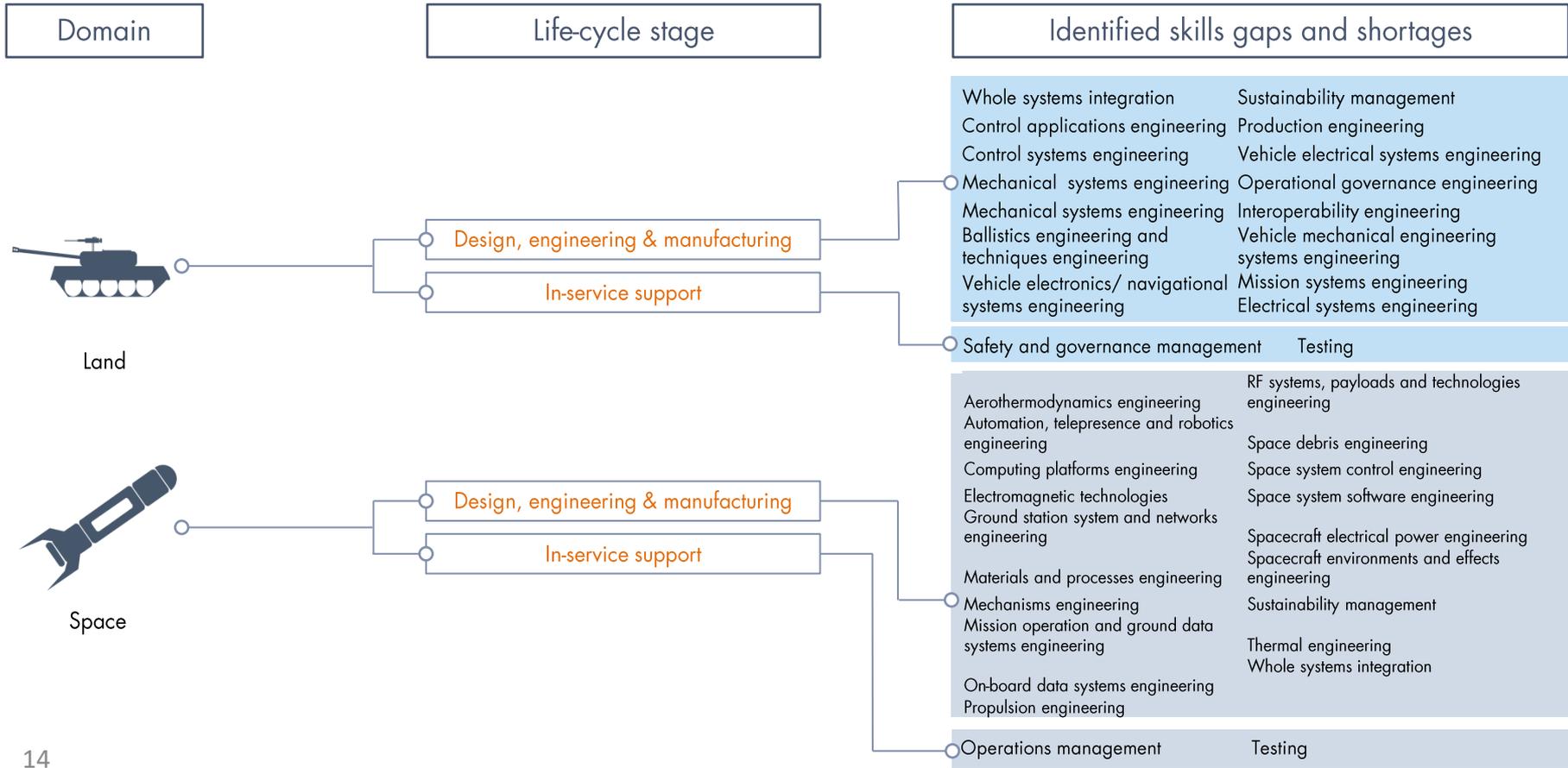
Domain-specific skills mismatches



Domain-specific skills mismatches



Domain-specific skills mismatches



Reported drivers of skills mismatches

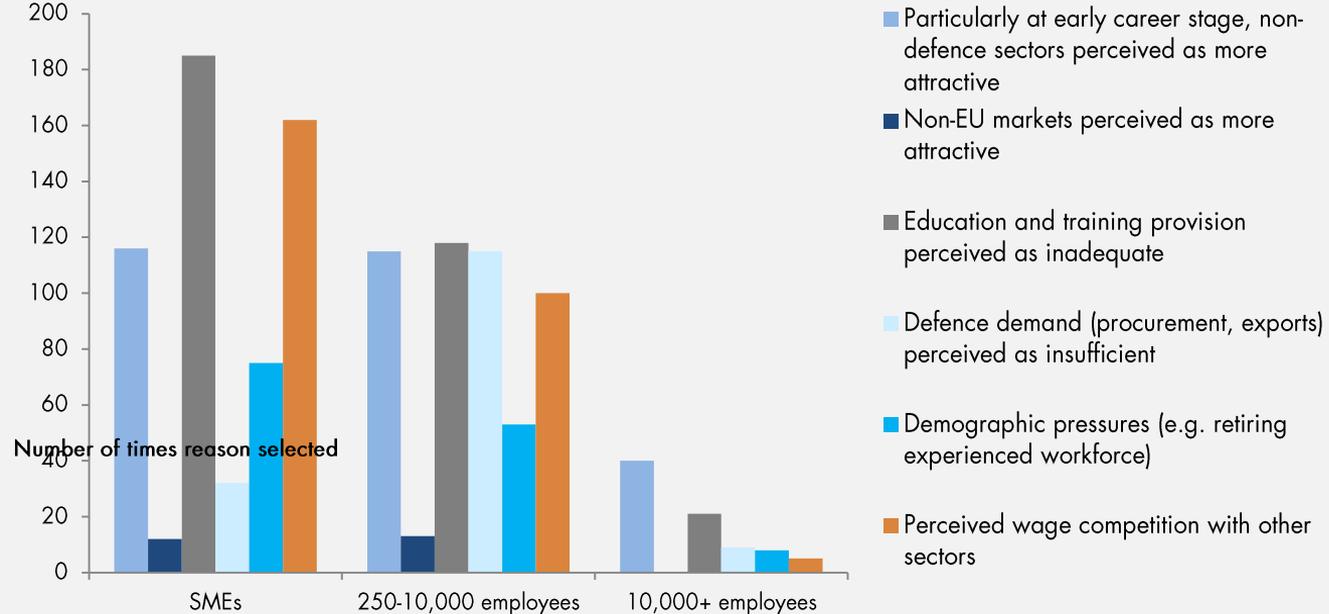
There are different reasons why skills mismatches arise



- For skills that are more easily transferable from the civil sector, wage competition and lower attractiveness of defence are seen to drive mismatches
- For domain specific skills, low defence demand and demographic challenges are seen as key drivers of skills mismatches due to the high risk of skills atrophy
- Skills mismatches can have impact on the EDTIB, potentially undermining companies' competitiveness and ability to innovate

Illustration of skills mismatches by company size

For SMEs, competition for talent is a key concern, while larger companies report skills challenges due to insufficient defence demand



Implications of skills gaps and shortages

Skills mismatches can undermine industry's competitiveness and innovation capacity



- Skills mismatches can hinder the EDTIB's competitiveness, ability to deliver capabilities, and ability to innovate
- The overlap between current and near-term skills mismatches suggests there may be chronic difficulty in accessing and retaining skills
- Uncertainty in relation to defence demand induces the EDTIB to take risks when determining whether to retain or develop skills
- Competition for talent affects SMEs to a greater extent, while insufficient defence demand creates skills challenges for large companies

Mapping of skills supply

Skills are supplied through academic institutions and internal industry programmes



- Greater focus of European policymaking on defence-related issues has raised stakeholder awareness of EU skills funding opportunities and related tools
- The majority of identified programmes are provided by academic institutions while many large companies have their own corporate development programmes, targeting different skills groups and career stages
- Most European reviewed programmes are dual-use in nature and target design, engineering and manufacturing skills, with dual degree programmes integrating non-defence skills in defence education
- For more specialised defence skills, a large proportion of workforce development occurs internally in companies as part of defence equipment programmes through hands-on learning

	National strategy			Identified top-down initiatives		Identified bottom-up initiatives	
Country	Skills focus in defence strategy	Industry/domain specific	National strategy on skills	Education programmes	Other top down initiatives	Industry-led initiatives	Collaborative initiatives
Denmark	✓	✓	-	✓	-	✓	✓
	Skills focus			Systems engineering and design		Management; avionics	Systems engineering & design, mechanical and production engineering
	Examples			Defend Arktis, Haderslev Municipality, Aeronautical Center of Excellence		Mercantec and Scandinavian Avionics	Innovation Network Production, Drone Countermeasures Project
Finland	-	✓	-	✓	✓	✓	✓
	Skills focus			Cybersecurity and Information Technology including coding	Military science and artificial intelligence	Operational skills related to training in aerospace/naval	Computer science and coding, future technologies
	Examples			Kymeenlaakso University of Applied Sciences, Aalto University	Finnish Center for AI	Patria, Robonic Company, Surma	MyTech, Saab and Aalto University, Aalto University and Accenture
France	✓	✓	-	✓	✓	✓	✓
	Skills focus			Engineering; propulsion, naval architecture; sensors, geolocation and navigation; complex systems; CBRN	Practical technical training, in-service support and operations	Cross-functional skills; management; in-service support; testing; design;	Engineering; project management; energy production systems and platforms; nuclear technology
	Examples			ISAE-SUPAERO MSc, Advanced Masters at the ENSTA Bretagne	Institut des hautes études de défense nationale (IHEDN); French Naval Academy	Safran Helicopter Engines Academy, apprenticeships (Dassault, Thales), Naval Group Professional Bridges	ENSTA Bretagne, AEROCAMPUS Aquitaine

	National strategy			Identified top-down initiatives		Identified bottom-up initiatives	
Country	Skills focus in defence strategy	Industry/domain specific	National strategy on skills	Education programmes	Other top down initiatives	Industry-led initiatives	Collaborative initiatives
Germany	✓	✓	-	✓	✓	✓	✓
	Skills focus			Engineering; technology (aircraft, naval, microsystems, energy); communications systems, integrated systems, digitalisation, IT		Generic engineering skills, mechanical engineering, industrial engineering, management, computer science, vessel systems, mine warfare, submarine systems, naval weapons, mathematical engineering	
	Examples			TU Munich Aerospace Engineering MSc, TU Dresden Computational Science and Engineering, UNIBW MSc Cyber Security, TU Munich Robotics	DLR School Labs, DLR: undergraduate, doctoral degrees, dual degree, apprenticeship	Next Gen Engineering Defence, TKMS Technical Graduate Program, Lürssen Dual Degree Program, MTU Dual Degree Program, MBDA Dual Degree Program	
Italy	✓	-	-	✓	✓	✓	✓
	Skills focus			Engineering (aerospace, mechanical); aerospace systems and propulsion, naval engineering and design, light-weight construction, (embedded) system engineering, photonic technologies	General manufacturing skills in the air and land domain	Mechanical engineering, aeronautical design and engineering, composite materials engineering, management, in-service support (rotary-wing aircraft)	Management (aerospace sector), Engineering (advanced and composite materials, naval), enabling technologies, microsatellites
	Examples			Programme in Electronics for Aerospace, MA in Photonic integrated circuit sensors and network, PhD in emerging digital technologies	Traineeships in state-owned weapons plants, training for defence leavers (pilot phase)	Leonardo Training Academy, Fincantieri Corporate University, UNAVIA training	Higher Technical Institutes (Leonardo, Fincantieri), DAC Research and training programmes

	National strategy			Identified top-down initiatives		Identified bottom-up initiatives	
Country	Skills focus in defence strategy	Industry/domain specific	National strategy on skills	Education programmes	Other top down initiatives	Industry-led initiatives	Collaborative initiatives
 Netherlands	✓	✓	✓	✓	✓	✓	✓
	Skills focus			Design and engineering (aerospace, computer, electrical, materials science, mechanical), marine technology, management	Engineering (space, mechatronics, aerospace); technical skills	Engineering, marine technology, cloud security, cyber, software, 3D simulations, gaming, VR	Systems engineering & design, mechanical and production engineering
	Examples			Royal Institute for the Navy Military Scientific Training, 'DARE' Aerospace Rocket Engineering, TU Delft Aerospace Engineering MSC	VEVA Defence-specific Vocational Training Programme, NLR Internship programme	FoxAcademy; EC-Council Certified Ethical Hacker Programme, Damen and KMWE Traineeship	TNO Traineeship, TNO Internship
 Poland	-	✓	✓	✓	✓	✓	✓
	Skills focus			Design and engineering; cybernetics, defence planning, information security, management	System for supporting aerospace industry	Mechanical motoring, chemistry, battery development	Engineering skills
	Examples			Mechanical Engineering (Military Technical University)	Polish Aviation Valley Association	PZL-Ś Świdnik internship, Łucznicz Arms Factory professional internship	PGZ scholarship program for university students
 Spain	-	✓	-	✓	✓	✓	✓
	Skills focus			Engineering; management and systems	Engineering (Building Information Modelling)	STEM skills, coding, robotics, electronics	Naval skills and shipbuilding
	Examples			University Center of the Defense of San Javier , Centro Universitario de la Guardia Civil, CESDEN, CUD	Institute of Engineering in Spain (IIE)	Indra Smart Start, SASCorp MakerLab	Navantia Strategic collaboration, UDC Joint Research Unit

	National strategy			Identified top-down initiatives		Identified bottom-up initiatives	
Country	Skills focus in defence strategy	Industry/domain specific	National strategy on skills	Education programmes	Other top down initiatives	Industry-led initiatives	Collaborative initiatives
Sweden	✓	✓	-	✓	-	✓	✓
	Skills focus			Design and engineering (aerospace, maritime, weapons systems, mechanical, automation, mechatronics, industrial), disposal, project management, software engineering		General engineering, software engineering, cyber, management	Design, engineering, management
	Examples			KTH Aerospace Engineering MSc, University of Gothenburg Software Engineering and Management BSc, Chalmers Naval Architecture and Ocean Engineering MSc		Saab Technical High School, BAE Systems Schools partnerships, RISE Centre for Cybersecurity	FMV Technology Leap internship, Astronomical Youth Room Research School
UK	✓	✓	✓	✓	✓	✓	✓
	Skills focus			Systems engineering, cyber, defence modelling and simulation, military airworthiness, military analysis & problem-solving, explosives & CBRN forensics	General STEM skills; engineering; cyber	General STEM, manufacturing, systems engineering & design, software engineering, hardware & sensors engineering, weapons systems	Cyber, digital, engineering & technical skills, systems engineering, defence modelling & simulation, CBRN forensics
	Examples			MBA Defence (Cranfield University); Defence Technical Officer and Engineer Entry Scheme (Wellbeck College); Post 16 technical education T-skills plan	STEM returners programme, Operationalising Defence Youth STEM Outreach, Cyber Schools Programme	Leonardo Engineering Apprenticeships, BAE Systems Engineering Sponsorship Programme, MBDA Engineering Graduate Programme	Institute of Coding, MOD Enhanced Learning Credits Scheme, DTUS

Implications for sectoral skills strategy development

Stakeholder collaboration and identification of good practice key to addressing gaps



- There is an opportunity to pool and share resources, foster coordination and transfer knowledge across different stakeholders at the regional, national and transnational level
- Designing more tailored mechanisms and addressing relevant stakeholders is likely to be more effective in addressing the skills mismatches
- Particularly for smaller countries and companies, collaboration between industry, government bodies, and education sector could help address mismatches between skills provided by the education sector and the industry needs
- Existing EU-level mechanisms, tools & enabling structures can be capitalised upon in order to support industry, government and the education sector

Implications for sectoral skills strategy development (continued)

Stakeholder collaboration and identification of good practice key to addressing gaps



- Examples of good practice for sustaining, managing and retaining skills can be found in other sectors and countries
- Regular and formalised programmes for exchanging technical staff and experts could help sustain and cross-pollinate skills, particularly for SMEs
- Closer civil and defence linkages could more effectively harness the pool of skills required by both sectors
- Increasing the attractiveness of the defence sector is critical to attracting skilled talent
- The representation of industry, academia and EU MS in the EDSP could help establish an EU-wide coordinating effort on defence-related skills



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