R1.3 ANNEX 1 - Data driven analysis for the Skills Blueprint

Dissemination level: PU (public)

Co-funded by the
Erasmus+ Programme
of the European Union

The European Commission's support for the production of this document does not constitute an endorsement of the contents, which reflect the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

With the support of the Erasmus+ Programme of the European Union

Index

1. Current state 5
1.1 Robotics, AI and autonomous-systems domain 6
Technical skills 6
Defence-related skills 6
Transversal skills 7
1.2 C4ISTAR domain 7
Technical skills 7
Defence-related skills 8
Transversal skills 8
1.3 Cybersecurity domain 10
Technical skills 11
Defence-related skills 12
Transversal skills 12
2. Results 13
2.1. List of skills 13
2.2. List of job profiles 21
2.3. Classification of skills 31
3. Job profiles prioritization 62
4. Conclusions 66
Final Consideration on Cybersecurity Domain 66
References 68
Appendix 1: List of companies 71
Appendix 2: Insight on the influence of gender, age, non-cognitive skills and personality in defence careers 73
Appendix 3: Skills of the Robotics, AI and autonomous-systems domain 74
List of job offers 75
List of skills obtained with the survey to the defence companies 144
Filtered list of skills in the field 171
Appendix 4: Skills of the C4ISTAR domain 173
Technical skills 173
Transversal skills 203
Precision of the extraction process for Transversal Skills 223

Defence-related skills 224
Appendix 5. Labour market demand for the Robotics, AI and autonomous systems skills 228
Appendix 6. Labour market demand for the C4ISTAR technical skills 231
Appendix 7. Classification of skills in the Cybersecurity domain 235

Figure index

Figure 1 - Network-centric domains, as represented in NATO Nec C2 Maturity Model. 9
Figure 2 - ABC analysis with identification of the inflection points for labour market demand; skill number taken from Table 7. 228
Figure 3 - Pareto diagram of the labour market demand of the C4ISTAR technical skills. 234

Table index

Table 1 - Selected Technologies in the Cybersecurity domain. 12
Table 2 - List of skills for the Robotics, AI and Autonomous-Systems domain. 15
Table 3 - List of skills for the C4ISTAR domain 16
Table 4 - List of skills for the Cybersecurity domain. 20
Table 5 - List of job profiles for the Robotics, AI and Autonomous-Systems domain. 25
Table 6 - List of job profiles for the C4ISTAR domain. 28
Table 7 - List of job profiles for the Cybersecurity domain. 31
Table 8 - Classification of skills for the Robotics, AI and Autonomous-Systems domain. 47
Table 9 - Classification of skills for the C4ISTAR domain. 53
Table 10 - Classification of skills for the Cybersecurity domain. 62
Table 11 - Top 10 job profiles per domain with descriptions. 65
Table 12 - Most relevant job profiles per domain. 66
Table 13 - Number of extracted entities and selected skills for each type of skill. 173
Table 14 - Completed list of technical skills extracted form ESCO using the technologies and apllications of C4ISTAR 202
Table 15 - Completed list of skills extracted from the C4ISTAR documents using the ESCO database. 221
Table 16 - Completed list of skills extracted from the C4ISTAR documents using the O*NET database. 223
Table 17 - Results of precision of the transversal skill 224
Table 18 - Completed list of defence-related skills extracted from the C4ISTAR documents using the list of standard agreement of the Nato 224

Table 19 - Completed list of defence-related skills extracted from the C4ISTAR documents using the list of non-functional requirements. 225

Table 20 - Completed list of defence-related skills extracted from the C4ISTAR documents using the rule for extracting the non-functional requirements. 227

Table 21 - Occurrence identification. 230

Table 22 - Results of the analysis on labour market demand for the C4ISTAR technical skills. 233

1. Current state

This paragraph includes an overview of the actual landscape of skills in relation to the three technological domains under analysis, i.e. Robotics, AI and autonomous-systems, C4ISTAR and Cybersecurity.

In order to provide a suitable framework to understand this document, there are three key concepts at stake – applications, technologies and skills. According to the Cambridge dictionary, an application is a way in which something can be used for a particular purpose. In deliverable R1.2, technologies used for applications in each of the following domain were identified. In connection to that, the purpose of this document is to find the set of skills needed to exploit or related to the identified technologies.

The evolution of technologies in various domain related to the defence industry is faster and more complex than in the past, especially for disruptive technology. Nowadays it is necessary finding and applying different policies to increase the sustainability and the capacity of the European defence industry. "Defence Research and Development, with its Research and Technologies component deserving a particular emphasis, is a key enabler of the future capacity of EU armed forces to match or outperform the capabilities of potential adversaries, to provide an effective answer to new emerging threats and to ensure their capacity to act together"[1].

Moreove, according to the questionnaire answers from Mercantec - Centre for Advanced Technology, reported in Appendix 1 "*AAU & PRZ Industrial Survey*" of the Annex 1 of the Result R1.2 Defence Technologies Roadmap, a variety of different technical subjects are being taught as part of the Mercantec programmes, including different competences and technologies. Competences and technologies are not necessarily linked to a single education or programme but converges among different educations. The following list of technology subjects is identified:

- Manufacturing – taught using milling machines and lathes up to 5 axes[1]. The combination between robotics and milling is quite unique and has been part of their "National Knowledge center for automations and Robotics". In connection with manufacturing, materials science is also included in the programmes so that the students experience the different possibilities and limitations and correct choice of tools and technics according to the material;
- Additive Manufacturing (AM) is taught as an integrated subject within the Smart Manufacturing (SM) – combining and comparing the different manufacturing methods. This includes 3D printing in different polymer materials combined with Kevlar and carbon;
- Advanced welding techniques – using different welding methods and materials – automated welding using robots;
- Auto mechanics – all aspects of repair and maintenance of vehicles and motors (diesel, gasoline, hybrid and hydrogen) – primarily cars;
- Engineering and system integration – which includes a variety of different technologies: Programming of PLC's (programmable logic controller such as those manufactured by Siemens, Allen Bradley, Omron and Schneider); Working with hydraulic and pneumatic systems; Handling and programming of Robots (KUKA, Fanuc and ABB) and Cobots (UR5); Setting up and troubleshooting on complex and fully automated conveyor systems; System integration under the umbrella of Industry 4.0;

- Drones – Aspects such as configuration and maintenance perspective are taught;
- Cyber security – this is taught at the data department that educates IT-supporters and data technicians/engineers. In the field of data handling they furthermore teach: Basic and advanced programming using the most popular languages among others #C, python, C++, SWIFT; AI and machine learning; Industrial use of data – how is data collection and handling activated in an industrial environment; Data centres – they have developed a special education program aiming at staff working at data centres.

However, defence-oriented education programmes are scarce and up-to-date cybersecurity technologies are not always present in the existing programmes. This excludes most of the labour force from receiving basic-level training in cybersecurity (awareness) despite their role being non-IT. Three kinds of training programmes are available today, where specific aspects of cybersecurity are covered:

- world-class certifications in cybersecurity (e.g., ISC2, ISACA);
- post-graduate programs (e.g., masters studies at universities);
- training in defence-related institutions (e.g., police, military).

This educational landscape entails some problems. First, workers with the skill and experience required in many job positions are scarce, which results in an under provisioned job market and inherent weakness in security for several organizations. Secondly, most studies are highly specialized or fragmented into subfields (e.g., forensic, hacking, operations, auditing) and typically require a background in ITC-related engineering.

1.1 Robotics, AI and autonomous-systems domain

Technical skills

The increasing pace of the emergence of new technologies, especially in AI, created many opportunities for new types of job profiles. Although this evolution is beneficial for the economic growth of the defence sector, it created a need for new talents and skills to support this new trend and succeed in the adoption of these new technologies [2].

In the R1.2 “Technology Roadmap”, 40 technologies in the fields of AI, autonomous systems and robotics and 26 potential defence applications are mapped. The link between the technologies and skills is strong but not trivial, i.e. the extracted list of technologies can guide defining the skills, but it is not possible exclusively rely on it. Therefore, four of the industrial partners gave insights regarding the skills and job profiles required in the defence industry. These technical skills and profiles range from AI modelling and engineering, robotics operation specialists, to networking and security specialists.

Those technical skills will be explored in detail in the following Paragraph 2.1 “List of skills”.

Defence-related skills

The input received from industrial partners and the investigation of job postings by defence contractors[1] suggests that the defence specific skills centre around:

[1] The full list of companies operating in the defence sector is reported in the Appendix 1 “List of defence contractors”.

- The ability to efficiently plan, monitor and control missions using mathematical modelling, simulation, optimisation and AI. These skills are useful to covers a wide range of missions such as target tracking, search, patrolling and rescue missions.
- The understanding of avionic and naval systems including Knowledge of Geographical Information System (GIS), control systems and navigation systems.
- The ability of install, operate, maintain and diagnose radars, satellites and their components such as sensors and actuators.

Note that in the areas of AI, robotics and autonomous systems, these defence-related skills are highly technical. In fact, the defence-related skills can be considered as a subset of technical skills.

Those defence-related skills will be explored in detail in the following Paragraph 2.1 “List of skills”.

Transversal skills

The defence companies who looking for profiles in AI, robotics and autonomous systems also seek additional transversal skills in their candidates. And these transversal skills are not necessarily correlated with the technical skills. Transversal or soft skills are highly important in the defence sector as they are associated with the ability to work in different conditions, communicate efficiently, and deal with people [3,4].

In general, defence companies require profiles with various skills depending on the environment, nature of job and team. The requirement can vary from the ability of thinking analytically to solve complex problems while working independently or within a team, to having knowledge about project management and adapting to change.

Those transversal skills will be explored in detail in the following Paragraph 2.1 “List of skills”.

1.2 C4ISTAR domain

Technical skills

The Technology Roadmap leads to the identification of 25 applications and 37 technologies related to the C4ISTAR domain. The most relevant combinations include the following technologies: internet, information system, vehicles, aerial, interfaces, mobile, sensor, software; and applications: communication, simulation, monitoring, programming, planning, identification. Therefore, those are the first topics to address in designing the educational programmes with the purpose to train new skilled workers that could handle the emerging technologies within the defence applications.

Defense agencies face a growing challenge of effectively processing, exploiting, and disseminating ISR data from multiple, diverse senor platforms for end-users who collaborate and share information within a net-centric enterprise environment [5]. Consequently, the workers need analytical skills and cognitive capabilities to manage and process the data collected by the information systems, analysing and evaluating information for the situational awareness.

They need to be able to interact with computers and specialized equipment, such as vehicles, mobile and aerial technologies. The advanced software demand of users with digital skills to write and submit instructions, specifications and programmes for computers and to exploit those systems, both in daily

operations and in mission simulation for training. In addition, users can experience real-time communication thanks to the new fast internet connections, ensuring timeliness in decision making and information sharing, to adapt the task to the actual situation and react promptly to the changes [6].

Moreover, future warfare will be characterized more and more by a system architecture approach, which takes advantage of new, emerging and disruptive technologies and uses platforms as nodes or components of a system [7]. These changes require forces capable to coordinate activities in mission planning and monitoring and to collaborate in the network in an integrated manner [8].

Therefore, the demand of STEM and ICT skills with references on multidisciplinary and technologies combination will increase in the future of defence industry.

Those technical skills will be explored in detail in the following Paragraph 2.1 “List of skills”.

Defence-related skills

This category is related to the knowledge, the use and the management of methods and procedures typical of the defence applications. In this sense, the NATO Standardization Agreements, known as STANAGs, that are the definitions of the processes, procedures, terms, and conditions for common military or technical procedures or equipment between the member countries of the alliance, are an element to take into consideration. In fact, each NATO member state implement the STANAGs into their own defence agencies to ensure the alignment with the international practices and so the coordination in the Alliance [9]. These documentations, together with other agreements, are managed by the NATO Standardization Office (NSO) and developed in collaboration with the NATO Consultation, Command and Control (C3) Board Interoperability Profiles Capability Team (IP CaT). The main purpose is to give guidelines to capability planners, programme managers and test managers for NATO common funded systems in the short or mid-term timeframes; to prescribe the necessary technical standards and profiles to achieve interoperability of Communications and Information Systems in support of NATO's missions and operations.

Moreover, the workers should ensure several non-functional requirements of a technological system during the exploitation to perform the operations properly. The non-functional requirements indicate an attribute of or a constraint on a system related to how the system behaves [10]. Therefore, understanding what those requirements are allows to have a clear overview of the behaviour of the workers in relation to the technological systems within defence-related tasks.

Those defence-related skills will be explored in detail in the following Paragraph 2.1 “List of skills”.

Transversal skills

Nowadays, most part of the conflicts have been defined as missions for peace keeping, so there were a greater variety of players involved and not only a single chain of command. Therefore, the main purpose is to achieve the “unity of effort” [11]. In this sense, giving proof of a style of leadership and working in team are fundamental capabilities to reach the mission accomplishment [12]. In fact, the C4ISTAR domain includes also the architecture that promotes interoperability and integration as well the approach to build the network to support land, air and naval troops and systems. Since nowadays the operative environment is strongly dependent by information-related capabilities, new relationships and interactions between the

commander and the operatives are emerging, especially in acquiring, managing, sharing and exploiting information to support individual and collective decision making [13]. The management methodology is the Network Centric approach, that is an evolution in respect of the traditional C2 practices based on the chain of command and a strong hierarchy. All the participating entities are connected in terms of Physical, Information, Cognitive, and Social Domains, as presented in the Figure 1. It means gathering and sharing information and elaborate them in order to accomplish the mission in a dynamic environment, and so having the ability to transition between actions in adopting an approach appropriate to the circumstances.

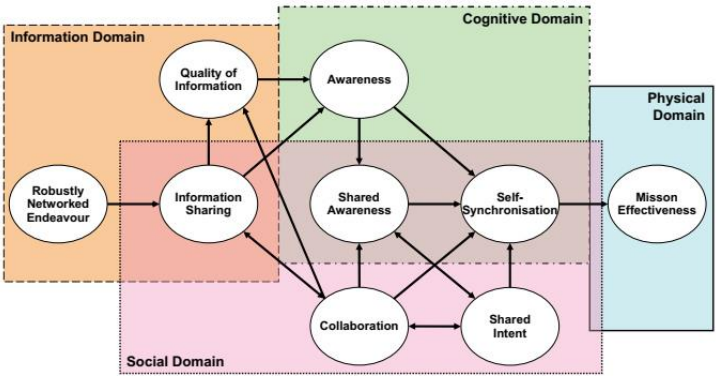

Figure 1 - Network-centric domains, as represented in NATO Nec C2 Maturity Model.

Moreover, the Consultation, Command and Control Board (C3B, the senior multinational policy body in the area of Consultation, Command and Control) produced a Taxonomy to synchronize all C3 capability activities in NATO by connecting the Strategic Concept and Political Guidance through the NATO Defence Planning Process (NDPP) to traditional Communications and Information Systems (CIS) architecture and design constructs. Its purpose is to provide a consistent common language and understanding of the CIS technical services landscape [14]. A part of this Taxonomy is related to the capabilities required by the Alliance for the successful completion of mission, that are the operational capabilities and the Communication and Information Systems (CIS) capabilities. This group includes 7 areas of skills: prepare; protect; engage; consult command and control; sustain; protect; inform.

In addition, the fast pace of changes during mission and daily operation requires users with strong problem-solving and agility skills. The former is related to develop and implement solutions to practical, operational or conceptual problems which arise in the execution of work [15]. The latter is “the synergistic combination of robustness, resilience, responsiveness, flexibility, innovation, and adaptation” [16]. Those are critical capability that leaders and teams need “to meet the challenges of complexity and uncertainty” [11] and “to effectively and efficiently employ the resources they have in a timely manner” [16].

Nowadays, the aviation industry both in civil and in defence is aware about the need of reducing its environment footprint [7]. Therefore, a long-term strategy will look for workers with green skills, related to the use of renewable energies and materials for defence equipment, the design and the production of engines with less CO2 emissions.

Furthermore, climate changes and resources scarcity are having a great impact on the globalized panorama, producing increased mobility of world population. The mobility generates a twofold effect: on one hand it

can lead to economic and social developments, on the other hand it could make the differences in social structures raise and increment the diffusion of epidemic and pandemic, as already happened with the Covid-19. These facts could call the defence forces to participate in humanitarian assistance and disaster relief operations in response to environmental crises [6]. Therefore, the future workers should show empathy in order to prevent any kind of symbolic violence and isolation and to guarantee a considerate attention to everyone [17].

Finally, there is a great influence of gender, age, non-cognitive skills and personality in defence careers, this matter is explored in detail in the Appendix 2 “Insight on the influence of gender, age, non-cognitive skills and personality in defence careers”.

Those transversal skills will be explored in detail in the following Paragraph 2.1 “List of skills”.

1.3 Cybersecurity domain

The management of cybersecurity is especially relevant nowadays given the increasing amount of cyberattacks, for instance, the European Commission is working on building an atlas to show cybersecurity centres of expertise [18] and help sharing cybersecurity knowledge. An essential issue is cybersecurity training and, in this regard, the definition of skills in the field of cybersecurity has attracted significant attention in recent years. Different organizations across the world are independently working on getting a unified view of the capabilities that cybersecurity experts should exhibit. In Europe, the European Union Agency for Cybersecurity (ENISA) [19] and a European initiative called “European Skills/Competences, qualification and Occupations” (ESCO) [20] are two prominent actors to be considered. One of the primary purposes of ENISA is providing cybersecurity recommendations and collaboration with operation teams throughout Europe and regulations like the EU Cybersecurity Act to stablish a cybersecurity certification framework for products and services [21] is a relevant example. Though not directly intended to specify cybersecurity professionals’ curricula, ENISA is working on improving cybersecurity workforce in Europe, being The European Cyber Security Challenge (ECSC) which will be held in Prague in Sep. 2021, a nice step in this regard [Moreover, ENISA has issued a report about the status of cybersecurity education [24], but, unfortunately, it does not provide detailed information about desirable skills for cybersecurity specialists. The ESCO, however, offers a classification of skills, competences, qualifications, and occupations that are relevant not only for the European job market but also for education and training. Although not primarily focused on cybersecurity, ENISA defines a set of computer-related skills that are also applicable to the field of cybersecurity. Besides, the European Committee for Standardisation (CEN) has released the N 16234-1 e-Competence Framework (e-CF) 4.0 [22], providing a common framework of 41 competences required in the Information and Communication Technology (ICT) professional work environment. Security is pointed out as a common knowledge in many areas, but cybersecurity is not directly mentioned, though cyber-attack techniques and countermeasures are introduced as a required knowledge for information security management. Also, the Joint Research Centre (JRC), the European Commission’s science and knowledge service, tries to connect national cybersecurity centres in a common network. To do so, cybersecurity context, its domains of application, research and knowledge were initially defined [23]. JRC proposed a taxonomy composed of cybersecurity/research domains, sectors/industries and applications and technologies and each of them is divided in different categories, but without getting into detail about skills

applied in each case. The development of a proper learning pathway for cybersecurity has also been studied by ENISA, partly as a means to attract more students for cybersecurity issues [24]. Therefore, we can conclude that Europe is working on cybersecurity training, but there is room for improving and defining a clear and unified view of the skills for cybersecurity specialists. As a matter of fact, a future European Cybersecurity Skills framework is envisioned for the near future, but it has not been publicly released yet [25].

In America, however, the National Institute of Standards and Technology (NIST) has developed a special publication called the "National Initiative for Cybersecurity Education (NICE) Cybersecurity Workforce Framework" (NIST SP-800-81) [26], last updated in 2017. This framework is a world-class standard that offers guidance in the development of a cybersecurity curriculum. Its intended audience includes not only present and future cybersecurity workers but also employers, educators/trainers, and technology providers. The NICE framework has several inter-related components. It establishes seven workforce categories and identifies several specialty areas within each category. For each specialty area, it identifies several work roles with its corresponding list of KSAs (Knowledge, Skills, and Abilities) associated, as well as a list of typical tasks. According to the NICE framework, Knowledges refer to "information applied directly to the performance of a function"; skills are defined as "observable competences to apply tools, frameworks, processes and controls that have an impact on the cybersecurity posture of an organization or individual"; and abilities correspond to "competences to perform an observable behaviour or a behaviour that results in an observable product".

Methodological note

Considering the worldwide acceptance of the NICE framework, the approach taken heavily leverages on this document. It must be noted that this framework has been authored by world-class experts, which ensures that the set of skills is comprehensive and non-biased. Therefore, the work carried out by USEV and UC3M subteams has been to analyze, merge, filter, and combine the content of the NICE framework (and subsequently the World Economic Forum and ESCO) for the sake of consistency.

To avoid any potential subteam-related bias, both subteams have worked independently. When their results did not match, the final result has been produced after a meeting where both sub-teams have confronted their arguments and discuss until coming to an agreement.

On the other hand, the identification of job profiles in the cybersecurity area is rather different to the remaining technological domains for the same reason – NICE identifies a comprehensive list of cybersecurity work profiles. In this case, the selection of job profiles has been carried out following a data-driven approach (particularly, text-mining) by UNIPI. In this regard, USEV and UC3M established the equivalency between the candidate NICE and ESCO job profiles chosen by UNIPI. On the other hand, UNIPI also chose a subset of skills that NICE relates to each job profile, following a text mining approach.

The involvement of external stakeholders (from industry and academia) for further validation is planned for the annual revision according to the project schedule.

Technical skills

Cybersecurity area is extremely wide but in the defence domain there are 15 top technologies which stand out from the rest, obtained in the T1.2 "Technology mapping" considering their relevance in the sector, the

lack of professionals and the relevance for the companies. Thus, new courses should address the companies demands, using selected technologies. These technologies are reported in the Table 1.

Selected technologies	
Identification	IDS
Authorization	Cyber threat intelligence
Cyber range	Risk assessment
Encryption	Secure SW development
Certification	Forensic analysis
Endpoint security	DoS protection
Vulnerability management	Cyber resilience
Hardware security	

Table 1 - Selected Technologies in the Cybersecurity domain.

Defence agencies should be able to deal with illegal accesses to systems, thus having knowledge of authentication and identification technologies. Moreover, encryption and certification are essential technologies to protect data, either in a storage or in transit. In the same way, network protection is a key feature working in the defence sector, where endpoint security and IDS technologies become a priority. Cyber threat intelligence, gathering information from any kind of source, is a challenge. The combination and analysis of information is mandatory to identify threats, especially stealthier ones. Not just discovering threats is important, but also its prevention and mitigation, being useful risk assessment technologies. Secure software development technologies also help in this process, because if security is considered from the analysis phase onward, some risks will be potentially avoided in future steps. However, when attacks have occurred or there are suspicions that some malicious actions have happened, forensic analysis technologies could be helpful. Finally, DoS protection technologies are selected, because DoS attacks are some of the most predominant ones and thus, they must be somehow prevented or mitigated.

Defence-related skills

The NICE framework encompasses several work roles that include tasks that are exclusive of defence (e.g., conducting cyber operations and collecting cyber intelligence). These work roles are quite related to gather information from different sources, even from the adversary, to detect or protect against malicious actions. The 10 defence-related skills related to such work roles are selected as the demanding ones for this sector.

The main purpose is to provide assorted skills such as the detection of malicious network and system activities, the coordination of intelligence planning teams, the identification of indicators of success or failure or doing reverse engineering to look for malicious traces.

Transversal skills

Transversal skills are those which are not directly linked to cybersecurity tasks but essential for a complete cybersecurity management. Some of these skills are critical thinking, conflict management, preparation and delivery of reports or complex problem solving, among others. In cybersecurity there are lot of information to deal with, different types of job profiles and complex analysis to carried out for discovering, preventing, or mitigating threats. In line with other disciplines, this one involves concepts which can be quite complex and confusing for non-technical people, being demanding the need of adapting content and results to the appropriate audience, and then, requiring skills for writing, documenting, and communicating. In the same

way, given the amount of information to be managed, there is also a need to solve complex problems and to offer guidance to strategic issues.

As a result, skills considered transversal from NICE framework are selected, together with some other described in several sources, including the Web Economic Forum (WEF) [27]. Then, 10 transversal skills have been selected.

2. Results

2.1. List of skills

The tables in this paragraph provide the list of skills related within the three technological domain under analysis domain in the following classes:

- Technical skills
- Transversal skills
- Defence-related skills

The list includes also the presence/absence of each skill in ESCO Database.

In particular:

- Table 2 presents the results of the Robotics, AI and autonomous-systems domain, the full table of the obtained data is reported in the Appendix 3. “Skills of the Robotics, AI and autonomous-systems domain”; Appendix 1 presents a list of companies for which defence related job offers and skills requirements were analysed in the step of skills identification;
- Table 3 presents the results of the C4ISTAR domain, the full table of the obtained data is reported in the Appendix 4. “Skills of the C4ISTAR domain”;
- Table 4 presents the results of the Cybersecurity domain; this table includes also the skill code from NICE database.

Skill	Type of skill	Presence in ESCO
Principles of artificial intelligence	Technical	Yes
Utilise machine learning	Technical	Yes
Utilise deep learning	Technical	No
Computer programming (Python, C, C++, R, Java, MATLAB, Lisp, Prolog)	Technical	Yes
Real-time computing	Technical	Yes
Decision support systems	Technical	Yes
Embedded systems	Technical	Yes
Distributed computing	Technical	Yes
Integrate system components	Technical	Yes
Design control systems	Technical	Yes
Assemble mechatronic units	Technical	Yes
Signal processing	Technical	Yes
Using digital tools for processing sound and images	Technical	Yes

With the support of the Erasmus+ Programme of the European Union

Skill	Type of skill	Presence in ESCO
Apply 3D imaging techniques	Technical	Yes
Use localisation tools	Technical	Yes
Guidance, navigation and control	Technical	Yes
Analyse big data	Technical	Yes
Perform data mining	Technical	Yes
Run simulations	Technical	Yes
Lead process optimisation	Technical	Yes
Use CAD software	Technical	Yes
Robot programming	Technical	No
Maintain robotic equipment	Technical	Yes
Model Based System Engineering	Technical	No
Design user interface	Technical	Yes
Control engineering	Technical	Yes
Cloud technologies	Technical	Yes
Algorithms	Technical	Yes
Functional safety of control systems	Technical	No
Risk management	Technical	Yes
Robotic components	Technical	Yes
Human-robot collaboration	Technical	No
Machine-machine collaboration	Technical	No
Create a product's virtual model	Technical	Yes
Scientific research methodology	Technical	Yes
Integration of 5G services with Cloud Services	Technical	No
Maintain operational communications	Transversal	Yes
Solving problems	Transversal	Yes
Work in an organised manner	Transversal	Yes
Work in teams	Transversal	Yes
Agile project management	Transversal	Yes
Work independently	Transversal	Yes
Analytical thinking	Transversal	Yes
Work in an international environment	Transversal	Yes
Demonstrate willingness to learn	Transversal	Yes
Adapt to change	Transversal	Yes
Target tracking	Defence-related	No
IFF systems and anti-surface warfare sensors	Defence-related	No
Radars	Defence-related	Yes
Field-programmable gate arrays (FPGA)	Defence-related	Yes
Geographic information systems (GIS)	Defence-related	Yes
Electronic Warfare	Defence-related	Yes
Satellites	Defence-related	No
Routing, trajectory planning, optimisation, guidance and control	Defence-related	No

Table 2 - List of skills for the Robotics, AI and Autonomous-Systems domain.

Skill	Type of skill	Presence in ESCO
administer ICT system	technical skill	yes
apply frequency management	technical skill	yes
conduct analysis of ship data	technical skill	yes
coordinate remote communications	technical skill	yes
coordinate technical standards for global interoperability	technical skill	yes
develop data link services for navigation purposes	technical skill	yes
develop data processing applications	technical skill	yes
develop software prototype	technical skill	yes
identify service requirements	technical skill	yes
implement ICT network diagnostic tools	technical skill	yes
innovate in ICT	technical skill	yes
interact through digital technologies	technical skill	yes
interact with programmer on intention of consultancy work	technical skill	yes
know software interaction design and use programming language such as C++, Java and Matlab[2]	technical skill	no
maintain emergency vehicle equipment	technical skill	yes
maintain radio communications equipment	technical skill	yes
manage standard enterprise resource planning system	technical skill	yes
monitor satellites	technical skill	yes
monitor system performance	technical skill	yes
operate port communications systems	technical skill	yes
oversee development of software	technical skill	yes
perform scrambling operations	technical skill	yes
perform small vessel navigation	technical skill	yes
relay messages through radio and telephone systems	technical skill	yes
repair ICT devices	technical skill	yes
simplify communication in maritime management	technical skill	yes
solve location and navigation problems by using GPS tools	technical skill	yes
teach computer science	technical skill	yes
use a complex communication system	technical skill	yes
use aeronautical mobile service communications	technical skill	yes
use automatic programming	technical skill	yes
use ICT systems	technical skill	yes
use interface description language	technical skill	yes
use mine planning software	technical skill	yes
use online communication tools	technical skill	yes

[2] The full list of programming languages and software retrieved from ESCO database is reported in the Appendix 4. "Skills of the C4ISTAR domain". It specifies that this list may include also other software specific of a given defence agencies and not publicly available.

Skill	Type of skill	Presence in ESCO
use production planning software	technical skill	yes
use reservoir surveillance	technical skill	yes
use software design patterns	technical skill	yes
use specific data analysis software	technical skill	yes
use water navigation devices	technical skill	yes
help people	transversal skill	yes
negotiation	transversal skill	no
operational resilience	transversal skill	yes
persuade	transversal skill	yes
provide leadership	transversal skill	yes
remain focused	transversal skill	yes
solve problems	transversal skill	yes
tactical planning	transversal skill	yes
team working	transversal skill	yes
think critically	transversal skill	yes
Ensure availability	defence-related skill	no
Ensure connectivity	defence-related skill	no
Ensure flexibility	defence-related skill	no
Ensure interoperability	defence-related skill	no
Ensure safety	defence-related skill	no
Ensure security	defence-related skill	no
Know STANAG 4607	defence-related skill	no
Know STANAG 4609	defence-related skill	no

Table 3 - List of skills for the C4ISTAR domain.

Skill code (from NICE)	Skill	Type of skill	Presence in ESCO
S0367	Skill to apply cybersecurity and privacy principles to organizational requirements (relevant to confidentiality, integrity, availability, authentication, non-repudiation).	technical skill	no
S0357	Skill to anticipate new security threats.	technical skill	no
S0124	Skill in troubleshooting and diagnosing cyber defense infrastructure anomalies and work through resolution.	technical skill	no
S0371	Skill to respond and take local actions in response to threat sharing alerts from service providers.	technical skill	no

Skill code (from NICE)	Skill	Type of skill	Presence in ESCO
S0077	Skill in securing network communications.	technical skill	no
S0178	Skill in analyzing essential network data (e.g., router configuration files, routing protocols), network traffic capacity and performance characteristics.	technical skill	no
S0185	Skill in applying analytical methods typically employed to support planning and to justify recommended strategies and courses of action.	technical skill	no
S0221	Skill in extracting information from packet captures.	technical skill	no
S0006	Skill in applying confidentiality, integrity, and availability principles.	technical skill	no
S0027	Skill in determining how a security system should work (including its resilience and dependability capabilities) and how changes in conditions, operations, or the environment will affect these outcomes.	technical skill	no
S0040	Skill in implementing, maintaining, and improving established network security practices.	technical skill	no
S0078	Skill in recognizing and categorizing types of vulnerabilities and associated attacks.	technical skill	no
S0096	Skill in reading and interpreting signatures (e.g., snort).	technical skill	no
S0156	Skill in performing packet-level analysis.	technical skill	no
S0173	Skill in using security event correlation tools.	technical skill	no
S0202	Skill in data mining techniques (e.g., searching file systems) and analysis.	technical skill	no
S0258	Skill in recognizing and interpreting malicious network activity in traffic.	technical skill	no
S0269	Skill in researching vulnerabilities and exploits utilized in traffic.	technical skill	no
S0288	Skill in using multiple analytic tools, databases, and techniques (e.g., Analyst's Notebook, A-Space,	technical skill	no

Skill code (from NICE)	Skill	Type of skill	Presence in ESCO
	Anchory, M3, divergent/convergent thinking, link charts, matrices, etc.).		
S0007	Skill in applying host/network access controls (e.g., access control list).	technical skill	yes (use access control software)
S0010	Skill in conducting capabilities and requirements analysis.	technical skill	no
S0015	Skill in conducting test event and secure test plan design (e. g. unit, integration, system, acceptance)	technical skill	no
S0018	Skill in creating policies that reflect system security objectives.	technical skill	no
S0020	Skill in developing and deploying signatures.	technical skill	no
S0031	Skill in developing and applying security system access controls.	technical skill	yes (user access control software)
S0032	Skill in developing, testing, and implementing network infrastructure contingency and recovery plans.	technical skill	yes (implement ICT recovery system)
S0036	Skill in evaluating the adequacy of security designs.	technical skill	no
S0063	Skill in collecting data from a variety of cyber defense resources.	technical skill	no
S0084	Skill in configuring and utilizing network protection components (e.g., Firewalls, VPNs, network intrusion detection systems).	technical skill	yes (implement a VPN)
S0087	Skill in deep analysis of captured malicious code (e.g., malware forensics).	technical skill	no
S0089	Skill in one-way hash functions (e.g., Secure Hash Algorithm [SHA], Message Digest Algorithm [MD5]) and verifying the integrity of all files.	technical skill	no
S0093	Skill in interpreting results of debugger to ascertain tactics, techniques, and procedures.	technical skill	no

Skill code (from NICE)	Skill	Type of skill	Presence in ESCO
S0120	Skill in reviewing logs to identify evidence of past intrusions.	technical skill	no
S0138	Skill in using Public-Key Infrastructure (PKI) encryption and digital signature capabilities into applications (e.g., S/MIME email, SSL traffic).	technical skill	no
S0164	Skill in assessing the application of cryptographic standards.	technical skill	no
S0195	Skill in conducting research using all available sources (including deep web)	technical skill	no
S0197	Skill in conducting social network analysis, buddy list analysis, and/or cookie analysis.	technical skill	no
S0270	Skill in reverse engineering (e.g., hex editing, binary packaging utilities, debugging, and strings analysis) to identify function and ownership of remote tools.	technical skill	no
S0317	Skill to compare indicators/observables with requirements.	technical skill	no
S0064	Skill in developing and executing technical training programs and curricula.	technical skill	no
S0070	Skill in talking to others to convey information effectively	transversal skill	no
S0356	Skill in communicating with all levels of management including Board members (e.g., interpersonal skills, approachability, effective listening skills, appropriate use of style and language for the audience).	transversal skill	-
S0344	Skill to prepare and deliver reports, presentations and briefings, to include using visual aids or presentation technology.	transversal skill	-
S0301	Skill in writing about facts and ideas in a clear, convincing, and organized manner.	transversal skill	-
S0213	Skill in documenting and communicating complex technical and programmatic information.	transversal skill	-

Skill code (from NICE)	Skill	Type of skill	Presence in ESCO
S0306	Skill to analyze strategic guidance for issues requiring clarification and/or additional guidance.	transversal skill	-
S0128	Skill in using manpower and personnel IT systems.	transversal skill	-
-	Conflict Management	transversal skill	-
-	Critical Thinking	transversal skill	-
-	Complex problem solving	transversal skill	-
S0182	Skill in analyzing target communications internals and externals collected from wireless LANs.	defence-related skill	no
S0242	Skill in interpreting vulnerability scanner results to identify vulnerabilities.	defence-related skill	no
S0252	Skill in processing collected data for follow-on analysis.	defence-related skill	no
S0255	Skill in providing real-time, actionable geolocation information utilizing target infrastructures.	defence-related skill	no
S0293	Skill in using tools, techniques, and procedures to remotely exploit and establish persistence on a target.	defence-related skill	no
S0295	Skill in using various open source data collection tools (online trade, DNS, mail, etc.).	defence-related skill	no
S0218	Skill in evaluating information for reliability, validity, and relevance.	defence-related skill	no
S0309	Skill to anticipate key target or threat activities which are likely to prompt a leadership decision.	defence-related skill	no
S0209	Skill in developing and executing comprehensive cyber operations assessment programs for assessing and validating operational performance characteristics.	defence-related skill	no
S0360	Skill to analyze and assess internal and external partner cyber operations capabilities and tools.	defence-related skill	no

Table 4 - List of skills for the Cybersecurity domain.

2.2. List of job profiles

The tables in this paragraph provide the list of job profiles related to the identified technical skills within the three technological domains under analysis domain. In particular:

- Table 5 presents the results of the Robotics, AI and autonomous-systems domain;
- Table 6 presents the results of the C4ISTAR domain;
- Table 7 presents the results of the Cybersecurity domain.

The job profiles derived from ESCO repositories and for what concern the Cybersecurity domain some entries come from NICE repositories.

Job profile	Skills
3D modeller	computer programming; perform data mining; apply 3D imaging techniques
3D animator	apply 3D imaging techniques
3D printing technician	use CAD software
aerodynamics engineer	scientific research methodology
aerospace engineer	create a product's virtual model; guidance, navigation and control
aerospace engineering drafter	create a product's virtual model; guidance, navigation and control
aerospace engineering technician	guidance, navigation and control
air traffic safety technician	design control systems; functional safety of control systems
aircraft interior technician	integrate system components; model based system engineering
application engineer	algorithms; computer programming; create a product's virtual model; design user interface; integrate system components; principles of artificial intelligence; robotic components; scientific research methodology; utilise machine learning; functional safety of control systems; human-robot collaboration; machine-machine collaboration; model based system engineering; robot programming; Use localisation tools
automation engineer	control engineering; functional safety of control systems; model based system engineering
automation engineering technician	control engineering; functional safety of control systems
automotive designer	create a product's virtual model
automotive engineer	create a product's virtual model; guidance, navigation and control; model based system engineering
automotive engineering drafter	create a product's virtual model; guidance, navigation and control; use CAD software
automotive engineering technician	guidance, navigation and control
biometrician	scientific research methodology

Job profile	Skills
broadcast technician	using digital tools for processing sound and images
business intelligence manager	risk management
calculation engineer	create a product's virtual model; run simulations; run simulations
chief data officer	cloud technologies; decision support systems
chief information officer	computer programming; decision support systems
chief technology officer	computer programming; decision support systems; scientific research methodology
component engineer	robotic components
computer-aided design operator	computer programming; use CAD software
computer hardware engineer	computer programming
computer hardware engineering technician	computer programming
computer numerical control machine operator	computer programming
computer scientist	perform data mining; scientific research methodology
container equipment design engineer	create a product's virtual model; use CAD software
corrosion technician	risk management
data analyst	analyse big data; cloud technologies; perform data mining
data centre operator	integrate system components;
data scientist	perform data mining
data warehouse designer	computer programming; design user interface
database administrator	distributed computing
database designer	computer programming
database developer	computer programming; integrate system components; perform data mining
database integrator	perform data mining
design engineer	create a product's virtual model; model based system engineering
drafter	create a product's virtual model; guidance, navigation and control
electrical drafter	create a product's virtual model; use CAD software
electrical engineer	computer programming; control engineering; design control systems; design user interface; risk management; robotic components; functional safety of control systems; model based system engineering
electrical mechanic	assemble mechatronic units
electromechanical drafter	create a product's virtual model
electronics drafter	create a product's virtual model; use CAD software

Job profile	Skills
electronics engineer	design user interface; risk management; robotic components; functional safety of control systems; model based system engineering
electronics engineering technician	control engineering
embedded system designer	computer programming; embedded systems; real-time computing; signal processing; Field-programmable gate arrays (FPGA)
embedded systems software developer	computer programming; design user interface; embedded systems; integrate system components; utilise deep learning
energy engineer	run simulations
engine designer	use CAD software
enterprise architect	computer programming
equipment engineer	robotic components; functional safety of control systems; human-robot collaboration; machine-machine collaboration
ergonomist	create a product's virtual model; apply 3D imaging techniques; use CAD software
fluid power engineer	create a product's virtual model; use CAD software
ICT business analyst	cloud technologies; decision support systems
ICT capacity planner	cloud technologies; integration of 5G services with cloud services
ICT information and knowledge manager	decision support systems; perform data mining
ICT intelligent systems designer	computer programming; principles of artificial intelligence; utilise deep learning; Routing, trajectory planning, optimisation, guidance and control
ICT research manager	perform data mining; scientific research methodology
ICT system architect	computer programming; integrate system components; model based system engineering
ICT system integration consultant	integrate system components; model based system engineering
industrial designer	create a product's virtual model; human-robot collaboration; machine-machine collaboration
industrial engineer	control engineering; create a product's virtual model; guidance, navigation and control; lead process optimisation; apply 3D imaging techniques; functional safety of control systems; human-robot collaboration; machine-machine collaboration; model based system engineering
industrial robot controller	maintain robotic equipment; robotic components; functional safety of control systems; robot programming
industrial tool design engineer	create a product's virtual model; use CAD software
information manager	analyse big data; perform data mining
instrumentation engineer	design control systems; functional safety of control systems
instrumentation engineering technician	control engineering

Job profile	Skills
integrated circuit design engineer	create a product's virtual model; use CAD software
integration engineer	computer programming; embedded systems; integrate system components; machine-machine collaboration; model based system engineering
IT auditor	cloud technologies
knowledge engineer	cloud technologies; computer programming; decision support systems; principles of artificial intelligence; utilise deep learning
maintenance and repair engineer	lead process optimisation
manufacturing engineer	human-robot collaboration; machine-machine collaboration
manufacturing manager	risk management
marine engineer	guidance, navigation and control
marine engineering drafter	create a product's virtual model; guidance, navigation and control
marine engineering technician	guidance, navigation and control
marine upholsterer	integrate system components;
material stress analyst	create a product's virtual model; scientific research methodology
mathematician	algorithms; scientific research methodology
mechanical engineer	assemble mechatronic units; control engineering; create a product's virtual model; guidance, navigation and control; maintain robotic equipment; robotic components; scientific research methodology; functional safety of control systems; model based system engineering
mechanical engineering drafter	create a product's virtual model; use CAD software
mechatronics assembler	assemble mechatronic units; functional safety of control systems
mechatronics engineer	assemble mechatronic units; control engineering; functional safety of control systems; model based system engineering; robot programming
mechatronics engineering technician	assemble mechatronic units; control engineering; functional safety of control systems
microsystem engineer	control engineering
mobile application developer	computer programming; design user interface; integrate system components;
model maker	create a product's virtual model; use CAD software
naval architect	guidance, navigation and control
numerical tool and process control programmer	computer programming; use CAD software
optical engineer	control engineering
optoelectronic engineer	control engineering
packing machinery engineer	use CAD software

Job profile	Skills
printed circuit board designer	create a product's virtual model; use CAD software
production engineer	lead process optimisation
remote sensing technician	using digital tools for processing sound and images; Geographic information systems (GIS); Radars
research and development manager	risk management
research engineer	scientific research methodology
robotics engineer	assemble mechatronic units; maintain robotic equipment; robotic components; functional safety of control systems; human-robot collaboration; machine-machine collaboration; model based system engineering; robot programming
robotics engineering technician	assemble mechatronic units; control engineering; maintain robotic equipment; robotic components; functional safety of control systems; robot programming
rotating equipment engineer	create a product's virtual model; use CAD software
satellite engineer	create a product's virtual model; guidance, navigation and control; model based system engineering; Satellites
sensor engineer	control engineering
sensor engineering technician	control engineering
software analyst	computer programming
software architect	computer programming
software developer	computer programming; design user interface; integrate system components; utilise machine learning; Target tracking; Radars; IFF systems and anti-surface warfare sensors; Electronic Warfare
solar energy engineer	run simulations
statistical assistant	algorithms; analyse big data; scientific research methodology
statistician	algorithms; analyse big data; scientific research methodology
system configurator	cloud technologies; computer programming; embedded systems; integrate system components; machine-machine collaboration
telecommunications engineer	computer programming; integrate system components; signal processing
telecommunications engineering technician	computer programming; integrate system components;
tooling engineer	create a product's virtual model; use CAD software
user interface designer	computer programming; design user interface; Use localisation tools
user interface developer	computer programming; design user interface

Table 5 - List of job profiles for the Robotics, AI and Autonomous-Systems domain.

Job profile	Skills
ict network engineer	use a complex communication system; develop software prototype; implement ICT network diagnostic tools; use automatic programming; use software design patterns
ict system developer	identify service requirements; develop software prototype; monitor system performance; use automatic programming; use software design patterns
data centre operator	use online communication tools; solve location and navigation problems by using GPS tools; administer ICT system; monitor system performance
ict application developer	know software interaction design and use programming language such as C++, Java and Matlab2; develop software prototype; use automatic programming; use software design patterns
software developer	know software interaction design and use programming language such as C++, Java and Matlab2; develop software prototype; use automatic programming; use software design patterns
digital games developer	develop software prototype; use automatic programming; use software design patterns
application engineer	develop software prototype; use automatic programming; use software design patterns
aviation communications and frequency coordination manager	apply frequency management; coordinate technical standards for global interoperability; develop data link services for navigation purposes
chief information officer	interact with programmer on intention of consultancy work; administer ICT system; oversee development of software
chief technology officer	interact with programmer on intention of consultancy work; administer ICT system; oversee development of software
embedded systems software developer	develop software prototype; use automatic programming; use software design patterns
ict application configurator	develop software prototype; use automatic programming; use software design patterns
ict consultant	identify service requirements; manage standard enterprise resource planning system; monitor system performance

Job profile	Skills
ict network administrator	interact through digital technologies; use a complex communication system; implement ICT network diagnostic tools
ict research consultant	identify service requirements; develop software prototype; innovate in ICT
industrial mobile devices software developer	develop software prototype; use automatic programming; use software design patterns
intelligence communications interceptor	use online communication tools; apply frequency management; perform scrambling operations
mobile application developer	develop software prototype; use automatic programming; use software design patterns
software architect	know software interaction design and use programming language such as C++, Java and Matlab2; develop software prototype; oversee development of software
user interface developer	develop software prototype; use automatic programming; use software design patterns
web developer	develop software prototype; use automatic programming; use software design patterns
aviation data communications manager	use online communication tools; use a complex communication system
communication scientist	interact through digital technologies; use a complex communication system
database administrator	administer ICT system; use automatic programming
ict network technician	use online communication tools; implement ICT network diagnostic tools
ict system administrator	administer ICT system; monitor system performance
ict system analyst	identify service requirements; monitor system performance
ict technician	administer ICT system; repair ICT devices
software analyst	develop software prototype; monitor system performance
telecommunications manager	use online communication tools; interact with programmer on intention of consultancy work
e-learning architect	monitor system performance
aviation surveillance and code coordination manager	coordinate technical standards for global interoperability
avionics technician	solve location and navigation problems by using GPS tools
broadcast technician	administer ICT system

Job profile	Skills
data scientist	develop data processing applications
database developer	use software design patterns
database integrator	use interface description language
deck officer	use water navigation devices
digital forensics expert	implement ICT network diagnostic tools
embedded system designer	identify service requirements
ethical hacker	monitor system performance
ict auditor manager	manage standard enterprise resource planning system
ict business analysis manager	identify service requirements
ict business analyst	identify service requirements
ict business development manager	innovate in ICT
ict capacity planner	administer ICT system
ict documentation manager	interact with programmer on intention of consultancy work
ict help desk agent	use online communication tools
ict intelligent systems designer	identify service requirements
ict network architect	implement ICT network diagnostic tools
ict operations manager	use online communication tools
ict product manager	interact with programmer on intention of consultancy work
ict research manager	innovate in ICT
ict security consultant	monitor system performance
ict system architect	identify service requirements
ict system integration consultant	monitor system performance
ict system tester	monitor system performance
integrated circuit design engineer	monitor system performance
integration engineer	identify service requirements
it auditor	identify service requirements
marine electronics technician	use water navigation devices
mobile devices technician	repair ICT devices
operations manager	manage standard enterprise resource planning system
radio technician	maintain radio communications equipment
satellite engineer	monitor satellites
software manager	interact with programmer on intention of consultancy work
telecommunications engineer	implement ICT network diagnostic tools
telecommunications engineering technician	use online communication tools
telecommunications equipment maintainer	maintain radio communications equipment

Table 6 - List of job profiles for the C4ISTAR domain.

Job profile	Skills
application engineer	skill to apply cybersecurity and privacy principles to organizational requirements (relevant to confidentiality, integrity, availability, authentication, non-repudiation); skill in applying confidentiality, integrity, and availability principles; skill in conducting capabilities and requirements analysis
chief ict security officer	skill to apply cybersecurity and privacy principles to organizational requirements (relevant to confidentiality, integrity, availability, authentication, non-repudiation)
collection manager	skill to compare indicators/observables with requirements
criminal investigator	skill in developing, testing, and implementing network infrastructure contingency and recovery plans; skill in deep analysis of captured malicious code (e.g., malware forensics); skill in one-way hash functions (e.g., secure hash algorithm [sha], message digest algorithm [md5]) and verifying the integrity of all files; skill in interpreting results of debugger to ascertain tactics, techniques, and procedures
cyber defense analyst	skill to apply cybersecurity and privacy principles to organizational requirements (relevant to confidentiality, integrity, availability, authentication, non-repudiation); skill in determining how a security system should work (including its resilience and dependability capabilities) and how changes in conditions, operations, or the environment will affect these outcomes; skill in recognizing and categorizing types of vulnerabilities and associated attacks; skill in reading and interpreting signatures (e.g., snort); skill in performing packet-level analysis; skill in developing and deploying signatures; skill in evaluating the adequacy of security designs; skill in collecting data from a variety of cyber defense resources
cyber defense incident responder	skill in securing network communications; skill in recognizing and categorizing types of vulnerabilities and associated attacks; skill in using security event correlation tools
cyber defense infrastructure support specialist	skill to apply cybersecurity and privacy principles to organizational requirements (relevant to confidentiality, integrity, availability,

Job profile	Skills
	authentication, non-repudiation); skill in troubleshooting and diagnosing cyber defense infrastructure anomalies and work through resolution; skill in securing network communications; skill in applying host/network access controls (e.g., access control list)
cyber intel planner	skill in applying analytical methods typically employed to support planning and to justify recommended strategies and courses of action
cyber operator	skill in extracting information from packet captures; skill in data mining techniques (e.g., searching file systems) and analysis; skill in reverse engineering (e.g., hex editing, binary packaging utilities, debugging, and strings analysis) to identify function and ownership of remote tools
cyber ops planner	skill in applying analytical methods typically employed to support planning and to justify recommended strategies and courses of action
data analyst	skill in data mining techniques (e.g., searching file systems) and analysis; skill in using multiple analytic tools, databases, and techniques (e.g., analyst's notebook, a-space, anchory, m3, divergent/convergent thinking, link charts, matrices, etc.); skill in one-way hash functions (e.g., secure hash algorithm [sha], message digest algorithm [md5]) and verifying the integrity of all files
digital forensics expert	skill in performing packet-level analysis; skill in developing, testing, and implementing network infrastructure contingency and recovery plans; skill in deep analysis of captured malicious code (e.g., malware forensics); skill in one-way hash functions (e.g., secure hash algorithm [sha], message digest algorithm [md5]) and verifying the integrity of all files; skill in interpreting results of debugger to ascertain tactics, techniques, and procedures
enterprise architect	skill to apply cybersecurity and privacy principles to organizational requirements (relevant to confidentiality, integrity, availability, authentication, non-repudiation); skill in determining how a security system should work (including its resilience and dependability capabilities) and how changes in conditions,

Job profile	Skills
	operations, or the environment will affect these outcomes
exploitation analyst	skill in recognizing and interpreting malicious network activity in traffic; skill in researching vulnerabilities and exploits utilized in traffic
ict network administrator	skill in securing network communications; skill in implementing, maintaining, and improving established network security practices; skill in configuring and utilizing network protection components (e.g., firewalls, vpns, network intrusion detection systems)
ict product manager	skill in using multiple analytic tools, databases, and techniques (e.g., analyst's notebook, a-space, anchory, m3, divergent/convergent thinking, link charts, matrices, etc.)

Table 7 - List of job profiles for the Cybersecurity domain.

2.3. Classification of skills

This paragraph describe the classification of the skills within each technological domain under analysis based on the following indicators:

- the **degree of specialisation**, that is how important is the skill for the relative job profile in the defence sector (low, medium, high);
- the **labour market demand**, that indicates how much a skill is required for the given job profile (low, medium, high);
- the **degree of knowledge**, that indicates the required level of a skill for the relative job profile to perform a defence-related job (low, medium, high).

In particular:

- Table 8 presents the results of the Robotics, AI and autonomous-systems domain, while a description of the complete analysis on the labour market demand with Pareto diagram is reported in the Appendix 5;
- Table 9 presents the results of the C4ISTAR domain[3], while a description of the complete analysis on the labour market demand with Pareto diagram is reported in the Appendix 6;
- The Table 10 presents the results of the cybersecurity domain and the full table of results is reported in the Appendix 7.

[3] It is specified that in the last 18 rows of this table there are the transversal and the defence-related. The demand for labour market has been automatically executed as explained in the R1.1 Strategy Specification; while the degree of specialization and the degree of knowledge have been manually evaluated. For the transversal skills the degree of knowledge is not quantified since they do not refer to a particular knowledge.

Skill	Job profile	Degree of specialisation	Degree of knowledge	Demand from labour market
Computer programming (Python, C, C++, R, Java, MATLAB, Lisp, Prolog)	3D modeller	Medium	High	High
Computer programming (Python, C, C++, R, Java, MATLAB, Lisp, Prolog)	application engineer	Medium	High	High
Computer programming (Python, C, C++, R, Java, MATLAB, Lisp, Prolog)	chief information officer	Medium	High	High
Computer programming (Python, C, C++, R, Java, MATLAB, Lisp, Prolog)	chief technology officer	Medium	High	High
Computer programming (Python, C, C++, R, Java, MATLAB, Lisp, Prolog)	computer hardware engineer	Medium	High	High
Computer programming (Python, C, C++, R, Java, MATLAB, Lisp, Prolog)	computer hardware engineering technician	Medium	High	High
Computer programming (Python, C, C++, R, Java, MATLAB, Lisp, Prolog)	computer numerical control machine operator	Medium	High	High
Computer programming (Python, C, C++, R, Java, MATLAB, Lisp, Prolog)	computer-aided design operator	Medium	High	High
Computer programming (Python, C, C++, R, Java, MATLAB, Lisp, Prolog)	data warehouse designer	Medium	High	High
Computer programming (Python, C, C++, R, Java, MATLAB, Lisp, Prolog)	database designed	Medium	High	High
Computer programming (Python, C, C++, R, Java, MATLAB, Lisp, Prolog)	database developer	Medium	High	High
Computer programming (Python, C, C++, R, Java, MATLAB, Lisp, Prolog)	electrical engineer	Medium	High	High
Computer programming (Python, C, C++, R, Java, MATLAB, Lisp, Prolog)	embedded system designer	Medium	High	High
Computer programming (Python, C, C++, R, Java, MATLAB, Lisp, Prolog)	embedded systems software developer	Medium	High	High
Computer programming (Python, C, C++, R, Java, MATLAB, Lisp, Prolog)	enterprise architect	Medium	High	High
Computer programming (Python, C, C++, R, Java, MATLAB, Lisp, Prolog)	ICT intelligent systems designer	High	High	High

Skill	Job profile	Degree of specialisation	Degree of knowledge	Demand from labour market
Computer programming (Python, C, C++, R, Java, MATLAB, Lisp, Prolog)	ICT system architect	High	High	High
Computer programming (Python, C, C++, R, Java, MATLAB, Lisp, Prolog)	integration engineer	Medium	High	High
Computer programming (Python, C, C++, R, Java, MATLAB, Lisp, Prolog)	knowledge engineer	Medium	High	High
Computer programming (Python, C, C++, R, Java, MATLAB, Lisp, Prolog)	mechatronics engineer	Medium	High	High
Computer programming (Python, C, C++, R, Java, MATLAB, Lisp, Prolog)	mobile application developer	Medium	High	High
Computer programming (Python, C, C++, R, Java, MATLAB, Lisp, Prolog)	numerical tool and process control programmer	Medium	High	High
Computer programming (Python, C, C++, R, Java, MATLAB, Lisp, Prolog)	software analyst	Medium	High	High
Computer programming (Python, C, C++, R, Java, MATLAB, Lisp, Prolog)	software architect	Medium	High	High
Computer programming (Python, C, C++, R, Java, MATLAB, Lisp, Prolog)	software developer	Medium	High	High
Computer programming (Python, C, C++, R, Java, MATLAB, Lisp, Prolog)	system configurator	Medium	High	High
Computer programming (Python, C, C++, R, Java, MATLAB, Lisp, Prolog)	telecommunications engineer	Medium	High	High
Computer programming (Python, C, C++, R, Java, MATLAB, Lisp, Prolog)	telecommunications engineering technician	Medium	High	High
Computer programming (Python, C, C++, R, Java, MATLAB, Lisp, Prolog)	user interface designer	Medium	High	High
Computer programming (Python, C, C++, R, Java, MATLAB, Lisp, Prolog)	user interface developer	Medium	High	High
Guidance, navigation and control	aerospace engineer	High	High	High
Guidance, navigation and control	aerospace engineering drafter	Medium	High	High

Skill	Job profile	Degree of specialisation	Degree of knowledge	Demand from labour market
Guidance, navigation and control	aerospace engineering technician	High	High	High
Guidance, navigation and control	automotive engineer	Medium	High	High
Guidance, navigation and control	automotive engineering drafter	Medium	High	High
Guidance, navigation and control	automotive engineering technician	Medium	High	High
Guidance, navigation and control	drafter	Medium	High	High
Guidance, navigation and control	industrial engineer	Medium	High	High
Guidance, navigation and control	marine engineer	High	High	High
Guidance, navigation and control	marine engineering drafter	Medium	High	High
Guidance, navigation and control	marine engineering technician	High	High	High
Guidance, navigation and control	mechanical engineer	Medium	High	High
Guidance, navigation and control	naval architect	High	High	High
Guidance, navigation and control	satellite engineer	High	High	High
Control engineering	automation engineer	Medium	Medium	High
Control engineering	automation engineering technician	Medium	Medium	High
Control engineering	electrical engineer	Medium	Medium	High
Control engineering	electronics engineering technician	Medium	Medium	High
Control engineering	industrial engineer	Medium	Medium	High
Control engineering	instrumentation engineering technician	Medium	Medium	High

Skill	Job profile	Degree of specialisation	Degree of knowledge	Demand from labour market
Control engineering	mechanical engineer	Medium	Medium	High
Control engineering	mechatronics engineer	Medium	Medium	High
Control engineering	mechatronics engineering technician	Medium	Medium	High
Control engineering	microsystem engineer	Medium	Medium	High
Control engineering	optical engineer	High	Medium	High
Control engineering	optoelectronic engineer	High	Medium	High
Control engineering	robotics engineering technician	Medium	Medium	High
Control engineering	sensor engineer	Medium	Medium	High
Control engineering	sensor engineering technician	Medium	Medium	High
Create a product's virtual model	aerospace engineer	High	High	High
Create a product's virtual model	aerospace engineering drafter	Medium	High	High
Create a product's virtual model	application engineer	Medium	High	High
Create a product's virtual model	automotive designer	Medium	High	High
Create a product's virtual model	automotive engineer	Medium	High	High
Create a product's virtual model	automotive engineering drafter	Medium	High	High
Create a product's virtual model	calculation engineer	Medium	High	High
Create a product's virtual model	container equipment design engineer	Medium	High	High
Create a product's virtual model	design engineer	Medium	High	High

Skill	Job profile	Degree of specialisation	Degree of knowledge	Demand from labour market
Create a product's virtual model	drafter	Medium	High	High
Create a product's virtual model	electrical drafter	Medium	High	High
Create a product's virtual model	electromechanical drafter	Medium	High	High
Create a product's virtual model	electronics drafter	Medium	High	High
Create a product's virtual model	ergonomist	Medium	High	High
Create a product's virtual model	fluid power engineer	Medium	High	High
Create a product's virtual model	industrial designer	Medium	High	High
Create a product's virtual model	industrial engineer	Medium	High	High
Create a product's virtual model	industrial tool design engineer	Medium	High	High
Create a product's virtual model	integrated circuit design engineer	Medium	High	High
Create a product's virtual model	marine engineering drafter	Medium	High	High
Create a product's virtual model	material stress analyst	Medium	High	High
Create a product's virtual model	mechanical engineer	Medium	High	High
Create a product's virtual model	mechanical engineering drafter	Medium	High	High
Create a product's virtual model	model maker	Medium	High	High
Create a product's virtual model	printed circuit board designer	Medium	High	High
Create a product's virtual model	rotating equipment engineer	Medium	High	High
Create a product's virtual model	satellite engineer	High	High	High
Create a product's virtual model	tooling engineer	Medium	High	High
Cloud technologies	chief data officer	Medium	Medium	High
Cloud technologies	data analyst	Medium	Medium	High
Cloud technologies	ICT business analyst	Medium	Medium	High

Skill	Job profile	Degree of specialisation	Degree of knowledge	Demand from labour market
Cloud technologies	ICT capacity planner	Medium	Medium	High
Cloud technologies	IT auditor	Medium	Medium	High
Cloud technologies	knowledge engineer	Medium	Medium	High
Cloud technologies	system configurator	Medium	Medium	High
Using digital tools for processing sound and images	broadcast technician	High	Medium	Medium
Using digital tools for processing sound and images	remote sensing technician	High	Medium	Medium
Utilise machine learning	application engineer	Medium	High	Medium
Utilise machine learning	software developer	Medium	High	Medium
Algorithms	application engineer	Medium	High	Medium
Algorithms	mathematician	Medium	High	Medium
Algorithms	statistical assistant	Medium	High	Medium
Algorithms	statistician	Medium	High	Medium
Integrate system components	aircraft interior technician	Medium	High	Medium
Integrate system components	data centre operator	Medium	High	Medium
Integrate system components	database developer	Medium	High	Medium
Integrate system components	embedded systems software developer	Medium	High	Medium
Integrate system components	ICT system architect	Medium	High	Medium
Integrate system components	ICT system integration consultant	Medium	High	Medium
Integrate system components	integration engineer	Medium	High	Medium
Integrate system components	marine upholsterer	Medium	High	Medium

Skill	Job profile	Degree of specialisation	Degree of knowledge	Demand from labour market
Integrate system components	mobile application developer	Medium	High	Medium
Integrate system components	software developer	Medium	High	Medium
Integrate system components	system configurator	Medium	High	Medium
Integrate system components	telecommunications engineer	High	High	Medium
Integrate system components	telecommunications engineering technician	High	High	Medium
Robot programming	application engineer	Medium	High	Medium
Robot programming	industrial robot controller	Medium	High	Medium
Robot programming	mechatronics engineer	Medium	High	Medium
Robot programming	robotics engineer	Medium	High	Medium
Robot programming	robotics engineering technician	Medium	High	Medium
Maintain robotic equipment	industrial robot controller	Medium	Medium	Medium
Maintain robotic equipment	mechanical engineer	Medium	Medium	Medium
Maintain robotic equipment	robotics engineer	Medium	Medium	Medium
Maintain robotic equipment	robotics engineering technician	Medium	Medium	Medium
Robotic components	application engineer	Medium	Low	Medium
Robotic components	component engineer	Medium	Low	Medium
Robotic components	electrical engineer	Medium	Low	Medium
Robotic components	electronics engineer	Medium	Low	Medium

Skill	Job profile	Degree of specialisation	Degree of knowledge	Demand from labour market
Robotic components	equipment engineer	Medium	Low	Medium
Robotic components	industrial robot controller	Medium	Low	Medium
Robotic components	mechanical engineer	Medium	Low	Medium
Robotic components	robotics engineer	Medium	Low	Medium
Robotic components	robotics engineering technician	Medium	Low	Medium
Run simulations	calculation engineer	Medium	High	Medium
Run simulations	energy engineer	Medium	High	Medium
Run simulations	solar energy engineer	Medium	High	Medium
Scientific research methodology	aerodynamics engineer	High	High	Medium
Scientific research methodology	application engineer	Medium	High	Medium
Scientific research methodology	biometrician	High	High	Medium
Scientific research methodology	chief technology officer	Medium	High	Medium
Scientific research methodology	computer scientist	Medium	High	Medium
Scientific research methodology	ICT research manager	Medium	High	Medium
Scientific research methodology	material stress analyst	Medium	High	Medium
Scientific research methodology	mathematician	Medium	High	Medium
Scientific research methodology	mechanical engineer	Medium	High	Medium
Scientific research methodology	research engineer	Medium	High	Medium
Scientific research methodology	statistical assistant	Medium	High	Medium
Scientific research methodology	statistician	Medium	High	Medium

Skill	Job profile	Degree of specialisation	Degree of knowledge	Demand from labour market
Functional safety of control systems	air traffic safety technician	Medium	High	Low
Functional safety of control systems	application engineer	Medium	High	Low
Functional safety of control systems	automation engineer	Medium	High	Low
Functional safety of control systems	automation engineering technician	Medium	High	Low
Functional safety of control systems	electrical engineer	Medium	High	Low
Functional safety of control systems	electronics engineer	Medium	High	Low
Functional safety of control systems	equipment engineer	Medium	High	Low
Functional safety of control systems	industrial engineer	Medium	High	Low
Functional safety of control systems	industrial robot controller	Medium	High	Low
Functional safety of control systems	instrumentation engineer	Medium	High	Low
Functional safety of control systems	mechanical engineer	Medium	High	Low
Functional safety of control systems	mechatronics assembler	Medium	High	Low
Functional safety of control systems	mechatronics engineer	Medium	High	Low
Functional safety of control systems	mechatronics engineering technician	Medium	High	Low
Functional safety of control systems	robotics engineer	Medium	High	Low
Functional safety of control systems	robotics engineering technician	Medium	High	Low
Utilise deep learning	embedded systems software developer	Medium	High	Low

Skill	Job profile	Degree of specialisation	Degree of knowledge	Demand from labour market
Utilise deep learning	ICT intelligent systems designer	Medium	High	Low
Utilise deep learning	knowledge engineer	Medium	High	Low
Apply 3D imaging techniques	3D animator	Medium	Medium	Low
Apply 3D imaging techniques	3D modeller	Medium	Medium	Low
Apply 3D imaging techniques	ergonomist	Medium	Medium	Low
Apply 3D imaging techniques	industrial engineer	Medium	Medium	Low
Use CAD software	3D printing technician	Low	Medium	Low
Use CAD software	automotive engineering drafter	Low	Medium	Low
Use CAD software	computer-aided design operator	Low	Medium	Low
Use CAD software	container equipment design engineer	Low	Medium	Low
Use CAD software	electrical drafter	Low	Medium	Low
Use CAD software	electronics drafter	Low	Medium	Low
Use CAD software	engine designer	Low	Medium	Low
Use CAD software	ergonomist	Low	Medium	Low
Use CAD software	fluid power engineer	Low	Medium	Low
Use CAD software	industrial tool design engineer	Low	Medium	Low
Use CAD software	integrated circuit design engineer	Low	Medium	Low
Use CAD software	mechanical engineering drafter	Low	Medium	Low
Use CAD software	model maker	Low	Medium	Low
Use CAD software	numerical tool and process control programmer	Low	Medium	Low

Skill	Job profile	Degree of specialisation	Degree of knowledge	Demand from labour market
Use CAD software	packing machinery engineer	Low	Medium	Low
Use CAD software	printed circuit board designer	Low	Medium	Low
Use CAD software	tooling engineer	Low	Medium	Low
Real-time computing	embedded system designer	Medium	High	Low
Analyse big data	data analyst	Medium	Medium	Low
Analyse big data	information manager	Medium	Medium	Low
Analyse big data	statistical assistant	Medium	Medium	Low
Analyse big data	statistician	Medium	Medium	Low
Model Based System Engineering	aircraft interior technician	Medium	High	Low
Model Based System Engineering	application engineer	Medium	High	Low
Model Based System Engineering	automation engineer	Medium	High	Low
Model Based System Engineering	automotive engineer	Medium	High	Low
Model Based System Engineering	design engineer	Medium	High	Low
Model Based System Engineering	electrical engineer	Medium	High	Low
Model Based System Engineering	electronics engineer	Medium	High	Low
Model Based System Engineering	ICT system architect	High	High	Low
Model Based System Engineering	ICT system integration consultant	Medium	High	Low
Model Based System Engineering	industrial engineer	Medium	High	Low
Model Based System Engineering	integration engineer	Medium	High	Low
Model Based System Engineering	mechanical engineer	Medium	High	Low

Skill	Job profile	Degree of specialisation	Degree of knowledge	Demand from labour market
Model Based System Engineering	mechatronics engineer	Medium	High	Low
Model Based System Engineering	robotics engineer	Medium	High	Low
Model Based System Engineering	satellite engineer	High	High	Low
Design control systems	air traffic safety technician	Medium	High	Low
Design control systems	electrical engineer	Medium	High	Low
Design control systems	instrumentation engineer	Medium	High	Low
Risk management	business intelligence manager	High	High	Low
Risk management	corrosion technician	Medium	High	Low
Risk management	electrical engineer	Medium	High	Low
Assemble mechatronic units	electrical mechanic	Medium	Medium	Low
Assemble mechatronic units	mechanical engineer	Medium	Medium	Low
Assemble mechatronic units	mechatronics assembler	Medium	Medium	Low
Assemble mechatronic units	mechatronics engineer	Medium	Medium	Low
Assemble mechatronic units	mechatronics engineering technician	Medium	Medium	Low
Assemble mechatronic units	robotics engineer	Medium	Medium	Low
Assemble mechatronic units	robotics engineering technician	Medium	Medium	Low
Design user interface	application engineer	Medium	High	Low
Design user interface	data warehouse designer	Medium	High	Low
Design user interface	electrical engineer	Medium	High	Low

Skill	Job profile	Degree of specialisation	Degree of knowledge	Demand from labour market
Design user interface	electronics engineer	Medium	High	Low
Design user interface	embedded systems software developer	Medium	High	Low
Design user interface	mobile application developer	Medium	High	Low
Design user interface	software developer	Medium	High	Low
Design user interface	user interface designer	Medium	High	Low
Design user interface	user interface developer	Medium	High	Low
Lead process optimisation	industrial engineer	Medium	High	Low
Lead process optimisation	maintenance and repair engineer	Medium	High	Low
Lead process optimisation	production engineer	Medium	High	Low
Embedded systems	embedded system designer	Medium	High	Low
Embedded systems	embedded systems software developer	High	High	Low
Embedded systems	integration engineer	Medium	High	Low
Embedded systems	system configurator	Medium	High	Low
Human-robot collaboration	application engineer	Medium	High	Low
Human-robot collaboration	equipment engineer	Medium	High	Low
Human-robot collaboration	industrial designer	Medium	High	Low
Human-robot collaboration	industrial engineer	Medium	High	Low
Human-robot collaboration	manufacturing engineer	Medium	High	Low
Human-robot collaboration	robotics engineer	Medium	High	Low

Skill	Job profile	Degree of specialisation	Degree of knowledge	Demand from labour market
Integration of 5G services with Cloud Services	ICT capacity planner	Medium	High	Low
Machine-machine collaboration	application engineer	Medium	High	Low
Machine-machine collaboration	equipment engineer	Medium	High	Low
Machine-machine collaboration	industrial designer	Medium	High	Low
Machine-machine collaboration	integration engineer	Medium	High	Low
Machine-machine collaboration	manufacturing engineer	Medium	High	Low
Machine-machine collaboration	robotics engineer	Medium	High	Low
Machine-machine collaboration	system configurator	Medium	High	Low
Principles of artificial intelligence	application engineer	Medium	Low	Low
Principles of artificial intelligence	ICT intelligent systems designer	Medium	Low	Low
Principles of artificial intelligence	knowledge engineer	Medium	Low	Low
Distributed computing	database administrator	Medium	High	Low
Perform data mining	3D modeller	Medium	Medium	Low
Perform data mining	computer scientist	Medium	Medium	Low
Perform data mining	data analyst	Medium	Medium	Low
Perform data mining	data scientist	High	Medium	Low
Perform data mining	database developer	Medium	Medium	Low
Perform data mining	database integrator	Medium	Medium	Low
Perform data mining	ICT information and knowledge manager	Medium	Medium	Low
Perform data mining	ICT research manager	Medium	Medium	Low

Skill	Job profile	Degree of specialisation	Degree of knowledge	Demand from labour market
Perform data mining	information manager	Medium	Medium	Low
Signal processing	embedded system designer	High	Medium	Low
Signal processing	telecommunications engineer	High	Medium	Low
Decision support systems	chief data officer	High	High	Low
Decision support systems	chief information officer	High	High	Low
Decision support systems	chief technology officer	High	High	Low
Decision support systems	ICT business analyst	Medium	High	Low
Decision support systems	ICT information and knowledge manager	High	High	Low
Decision support systems	knowledge engineer	High	High	Low
Use localisation tools	application engineer	High	High	Low
Use localisation tools	user interface designer	Medium	High	Low
Routing, trajectory planning, optimisation, guidance and control	ICT intelligent systems designer	High	High	High
Satellites	satellite engineer	High	Low	Medium
Target tracking	software developer	High	High	Low
Field-programmable gate arrays (FPGA)	embedded system designer	High	High	Low
Radars	remote sensing technician	High	Low	Low
Radars	software developer	High	Low	Low
IFF systems and anti-surface warfare sensors	software developer	High	High	Low

Skill	Job profile	Degree of specialisation	Degree of knowledge	Demand from labour market
Electronic Warfare	software developer	High	High	Low
Geographic information systems (GIS)	remote sensing technician	High	High	Low

Table 8 - Classification of skills for the Robotics, AI and Autonomous-Systems domain.

Skill	Occupation	Degree of Specialization	Degree of Knowledge	Demand from Labor Market
administer ICT system	data centre operator	Medium	High	Medium
administer ICT system	chief information officer	Medium	High	Medium
administer ICT system	chief technology officer	Medium	High	Medium
administer ICT system	database administrator	Medium	High	Medium
administer ICT system	ict system administrator	Medium	High	Medium
administer ICT system	ict technician	Medium	High	Medium
administer ICT system	broadcast technician	Medium	High	Medium
administer ICT system	ict capacity planner	Medium	High	Medium
apply frequency management	aviation communications and frequency coordination manager	Medium	Medium	Medium
apply frequency management	intelligence communications interceptor	Medium	Medium	Medium
coordinate technical standards for global interoperability	aviation communications and frequency coordination manager	Medium	High	Medium
coordinate technical standards for global interoperability	aviation surveillance and code coordination manager	Medium	High	Medium
develop data link services for navigation purposes	aviation communications and frequency coordination manager	High	High	Low

Skill	Occupation	Degree of Specialization	Degree of Knowledge	Demand from Labor Market
develop data processing applications	data scientist	High	High	Low
develop software prototype	ict network engineer	Medium	High	Low
develop software prototype	ict system developer	Medium	High	Low
develop software prototype	ict application developer	Medium	High	Low
develop software prototype	software developer	Medium	High	Low
develop software prototype	digital games developer	Medium	High	Low
develop software prototype	application engineer	Medium	High	Low
develop software prototype	embedded systems software developer	Medium	High	Low
develop software prototype	ict application configurator	Medium	High	Low
develop software prototype	ict research consultant	Medium	High	Low
develop software prototype	industrial mobile devices software developer	Medium	High	Low
develop software prototype	mobile application developer	Medium	High	Low
develop software prototype	software architect	Medium	High	Low
develop software prototype	user interface developer	Medium	High	Low
develop software prototype	web developer	Medium	High	Low
develop software prototype	software analyst	Medium	High	Low
identify service requirements	ict system developer	Medium	Medium	Low
identify service requirements	ict consultant	Medium	Medium	Low
identify service requirements	ict research consultant	Medium	Medium	Low
identify service requirements	ict system analyst	Medium	Medium	Low
identify service requirements	embedded system designer	Medium	Medium	Low
identify service requirements	ict business analysis manager	Medium	Medium	Low
identify service requirements	ict business analyst	Medium	Medium	Low
identify service requirements	ict intelligent systems designer	Medium	Medium	Low
identify service requirements	ict system architect	Medium	Medium	Low

Skill	Occupation	Degree of Specialization	Degree of Knowledge	Demand from Labor Market
identify service requirements	integration engineer	Medium	Medium	Low
identify service requirements	it auditor	Medium	Medium	Low
implement ICT network diagnostic tools	ict network engineer	Medium	Medium	Low
implement ICT network diagnostic tools	ict network administrator	Medium	Medium	Low
implement ICT network diagnostic tools	ict network technician	Medium	Medium	Low
implement ICT network diagnostic tools	digital forensics expert	Medium	Medium	Low
implement ICT network diagnostic tools	ict network architect	Medium	Medium	Low
implement ICT network diagnostic tools	telecommunications engineer	Medium	Medium	Low
innovate in ICT	ict research consultant	Medium	High	Low
innovate in ICT	ict business development manager	Medium	High	Low
innovate in ICT	ict research manager	Medium	High	Low
interact through digital technologies	ict network administrator	Low	Medium	High
interact through digital technologies	communication scientist	Low	Medium	High
interact with programmer on intention of consultancy work	chief information officer	Medium	Low	Low
interact with programmer on intention of consultancy work	chief technology officer	Medium	Low	Low
interact with programmer on intention of consultancy work	telecommunications manager	Medium	Low	Low
interact with programmer on intention of consultancy work	ict documentation manager	Medium	Low	Low
interact with programmer on intention of consultancy work	ict product manager	Medium	Low	Low
interact with programmer on intention of consultancy work	software manager	Medium	Low	Low
know software interaction design and use programming language such as C++, Java and Matlab2	ict application developer	Medium	Medium	High
know software interaction design and use programming language such as C++, Java and Matlab2	software developer	Medium	Medium	High

Skill	Occupation	Degree of Specialization	Degree of Knowledge	Demand from Labor Market
know software interaction design and use programming language such as C++, Java and Matlab2	software architect	Medium	Medium	High
maintain radio communications equipment	radio technician	Medium	Medium	Medium
maintain radio communications equipment	telecommunications equipment maintainer	Medium	Medium	Medium
manage standard enterprise resource planning system	ict consultant	Medium	High	High
manage standard enterprise resource planning system	ict auditor manager	Medium	High	High
manage standard enterprise resource planning system	operations manager	Medium	High	High
monitor satellites	satellite engineer	High	Medium	Low
monitor system performance	ict system developer	Medium	Medium	Medium
monitor system performance	data centre operator	Medium	Medium	Medium
monitor system performance	ict consultant	Medium	Medium	Medium
monitor system performance	ict system administrator	Medium	Medium	Medium
monitor system performance	ict system analyst	Medium	Medium	Medium
monitor system performance	software analyst	Medium	Medium	Medium
monitor system performance	e-learning architect	Medium	Medium	Medium
monitor system performance	ethical hacker	Medium	Medium	Medium
monitor system performance	ict security consultant	Medium	Medium	Medium
monitor system performance	ict system integration consultant	Medium	Medium	Medium
monitor system performance	ict system tester	Medium	Medium	Medium
monitor system performance	integrated circuit design engineer	Medium	Medium	Medium
oversee development of software	chief information officer	Medium	High	High
oversee development of software	chief technology officer	Medium	High	High
oversee development of software	software architect	Medium	High	High
perform scrambling operations	intelligence communications interceptor	High	Medium	Medium
repair ICT devices	ict technician	Medium	Medium	Low

Skill	Occupation	Degree of Specialization	Degree of Knowledge	Demand from Labor Market
repair ICT devices	mobile devices technician	Medium	Medium	Low
solve location and navigation problems by using GPS tools	data centre operator	Low	Medium	Low
solve location and navigation problems by using GPS tools	avionics technician	Low	Medium	Low
use a complex communication system	ict network engineer	Medium	Medium	Low
use a complex communication system	ict network administrator	Medium	Medium	Low
use a complex communication system	aviation data communications manager	Medium	Medium	Low
use a complex communication system	communication scientist	Medium	Medium	Low
use automatic programming	ict network engineer	Medium	Medium	Medium
use automatic programming	ict system developer	Medium	Medium	Medium
use automatic programming	ict application developer	Medium	Medium	Medium
use automatic programming	software developer	Medium	Medium	Medium
use automatic programming	digital games developer	Medium	Medium	Medium
use automatic programming	application engineer	Medium	Medium	Medium
use automatic programming	embedded systems software developer	Medium	Medium	Medium
use automatic programming	ict application configurator	Medium	Medium	Medium
use automatic programming	industrial mobile devices software developer	Medium	Medium	Medium
use automatic programming	mobile application developer	Medium	Medium	Medium
use automatic programming	user interface developer	Medium	Medium	Medium
use automatic programming	web developer	Medium	Medium	Medium
use automatic programming	database administrator	Medium	Medium	Medium
use interface description language	database integrator	High	Medium	Low
use online communication tools	data centre operator	Low	Medium	High

Skill	Occupation	Degree of Specialization	Degree of Knowledge	Demand from Labor Market
use online communication tools	intelligence communications interceptor	Low	Medium	High
use online communication tools	aviation data communications manager	Low	Medium	High
use online communication tools	ict network technician	Low	Medium	High
use online communication tools	telecommunications manager	Low	Medium	High
use online communication tools	ict help desk agent	Low	Medium	High
use online communication tools	ict operations manager	Low	Medium	High
use online communication tools	telecommunications engineering technician	Low	Medium	High
use software design patterns	ict network engineer	Medium	Medium	Medium
use software design patterns	ict system developer	Medium	Medium	Medium
use software design patterns	ict application developer	Medium	Medium	Medium
use software design patterns	software developer	Medium	Medium	Medium
use software design patterns	digital games developer	Medium	Medium	Medium
use software design patterns	application engineer	Medium	Medium	Medium
use software design patterns	embedded systems software developer	Medium	Medium	Medium
use software design patterns	ict application configurator	Medium	Medium	Medium
use software design patterns	industrial mobile devices software developer	Medium	Medium	Medium
use software design patterns	mobile application developer	Medium	Medium	Medium
use software design patterns	user interface developer	Medium	Medium	Medium
use software design patterns	web developer	Medium	Medium	Medium
use software design patterns	database developer	Medium	Medium	Medium
use water navigation devices	deck officer	Medium	Medium	Low
use water navigation devices	marine electronics technician	Medium	Medium	Low

Skill	Occupation	Degree of Specialization	Degree of Knowledge	Demand from Labor Market
help people	All	High	-	Medium
negotiation	All	High	-	Medium
operational resilience	All	High	-	Low
persuade	All	High	-	Low
provide leadership	All	High	-	Low
remain focused	All	High	-	Low
solve problems	All	High	-	Medium
tactical planning	All	High	-	Low
team working	All	High	-	Low
think critically	All	High	-	Low
Ensure availability	All	High	High	Low
Ensure connectivity	All	High	High	Low
Ensure flexibility	All	High	High	Low
Ensure interoperability	All	High	High	Low
Ensure safety	All	High	High	Low
Ensure security	All	High	High	Low
Know STANAG 4607	All	High	High	Low
Know STANAG 4609	All	High	High	Low

Table 9 - Classification of skills for the C4ISTAR domain.

Skill	Job profile	Degree of specialisation	Degree of knowledge	Demand from labour market
skill to apply cybersecurity and privacy principles to organizational requirements (relevant to confidentiality, integrity, availability, authentication, non-repudiation)	application engineer	High	Low	Low
skill in applying confidentiality, integrity, and availability principles	application engineer	High	Low	Low
skill in conducting capabilities and requirements analysis	application engineer	High	Low	Low
skill to apply cybersecurity and privacy principles to organizational requirements (relevant to confidentiality, integrity, availability, authentication, non-repudiation)	chief ict security officer	High	High	Low

Skill	Job profile	Degree of specialisation	Degree of knowledge	Demand from labour market
skill to compare indicators/observables with requirements	collection manager	High	Medium	Low
skill in developing, testing, and implementing network infrastructure contingency and recovery plans	criminal investigator	High	Low	Low
skill in deep analysis of captured malicious code (e.g., malware forensics)	criminal investigator	High	Medium	Low
skill in one-way hash functions (e.g., secure hash algorithm [sha], message digest algorithm [md5]) and verifying the integrity of all files	criminal investigator	High	Low	Low
skill in interpreting results of debugger to ascertain tactics, techniques, and procedures	criminal investigator	High	Medium	Low
skill to apply cybersecurity and privacy principles to organizational requirements (relevant to confidentiality,integrity, availability, authentication, non-repudiation)	cyber defense analyst	High	Medium	Medium
skill in determining how a security system should work (including its resilience and dependability capabilities) and how changes in conditions, operations, or the environment will affect these outcomes	cyber defense analyst	High	High	Medium
skill in recognizing and categorizing types of vulnerabilities and associated attacks	cyber defense analyst	High	Medium	Medium
skill in reading and interpreting signatures (e.g., snort)	cyber defense analyst	High	Medium	Medium
skill in performing packet-level analysis	cyber defense analyst	High	Medium	Medium
skill in developing and deploying signatures	cyber defense analyst	High	Medium	Medium
skill in evaluating the adequacy of security designs	cyber defense analyst	High	Medium	Medium

Skill	Job profile	Degree of specialisation	Degree of knowledge	Demand from labour market
skill in collecting data from a variety of cyber defense resources	cyber defense analyst	High	High	Medium
skill in securing network communications	cyber defense incident responder	High	Medium	Low
skill in recognizing and categorizing types of vulnerabilities and associated attacks	cyber defense incident responder	High	Medium	Low
skill in using security event correlation tools	cyber defense incident responder	High	Medium	Low
skill to apply cybersecurity and privacy principles to organizational requirements (relevant to confidentiality, integrity, availability, authentication, non-repudiation)	cyber defense infrastructure support specialist	High	Low	Medium
skill in troubleshooting and diagnosing cyber defense infrastructure anomalies and work through resolution	cyber defense infrastructure support specialist	High	Low	Medium
skill in securing network communications	cyber defense infrastructure support specialist	High	Low	Medium
skill in applying host/network access controls (e.g., access control list)	cyber defense infrastructure support specialist	High	Low	Medium
skill in applying analytical methods typically employed to support planning and to justify recommended strategies and courses of action	cyber intel planner	High	Medium	Low
skill in extracting information from packet captures	cyber operator	High	Low	Low
skill in data mining techniques (e.g., searching file systems) and analysis	cyber operator	High	Low	Low
skill in reverse engineering (e.g., hex editing, binary packaging utilities, debugging, and strings analysis) to identify function and ownership of remote tools	cyber operator	High	Low	Low
skill in applying analytical methods typically employed to	cyber ops planner	High	Medium	Low

Skill	Job profile	Degree of specialisation	Degree of knowledge	Demand from labour market
support planning and to justify recommended strategies and courses of action				
skill in data mining techniques (e.g., searching file systems) and analysis	data analyst	High	Low	High
skill in using multiple analytic tools, databases, and techniques (e.g., analyst's notebook, a-space, anchory, m3, divergent/convergent thinking, link charts, matrices, etc.)	data analyst	High	Low	High
skill in one-way hash functions (e.g., secure hash algorithm [sha], message digest algorithm [md5]) and verifying the integrity of all files	data analyst	Medium	Low	Low
skill in performing packet-level analysis	digital forensics expert	High	Medium	Low
skill in developing, testing, and implementing network infrastructure contingency and recovery plans	digital forensics expert	High	Low	Low
skill in deep analysis of captured malicious code (e.g., malware forensics)	digital forensics expert	High	Medium	Low
skill in one-way hash functions (e.g., secure hash algorithm [sha], message digest algorithm [md5]) and verifying the integrity of all files	digital forensics expert	High	Low	Low
skill in interpreting results of debugger to ascertain tactics, techniques, and procedures	digital forensics expert	High	Medium	Low
skill to apply cybersecurity and privacy principles to organizational requirements (relevant to confidentiality, integrity, availability, authentication, non-repudiation)	enterprise architect	High	High	High
skill in determining how a security system should work (including its resilience and	enterprise architect	High	Medium	Medium

Skill	Job profile	Degree of specialisation	Degree of knowledge	Demand from labour market
dependability capabilities) and how changes in conditions, operations, or the environment will affect these outcomes				
skill in recognizing and interpreting malicious network activity in traffic	exploitation analyst	High	Low	Low
skill in researching vulnerabilities and exploits utilized in traffic	exploitation analyst	High	Low	Low
skill in securing network communications	ict network administrator	High	Medium	Low
skill in implementing, maintaining, and improving established network security practices	ict network administrator	High	Medium	Low
skill in configuring and utilizing network protection components (e.g., firewalls, vpns, network intrusion detection systems)"	ict network administrator	High	Medium	Low
skill in using multiple analytic tools, databases, and techniques (e.g., analyst's notebook, a-space, anchory, m3, divergent/convergent thinking, link charts, matrices, etc.)	ict network administrator	Low	Low	Low
skill to apply cybersecurity and privacy principles to organizational requirements (relevant to confidentiality, integrity, availability, authentication, non-repudiation)	ict quality assurance manager	High	Low	Medium
skill in troubleshooting and diagnosing cyber defense infrastructure anomalies and work through resolution	ict quality assurance manager	High	Low	Medium
skill in applying confidentiality, integrity, and availability principles	ict quality assurance manager	High	Low	Medium
skill in determining how a security system should work (including its resilience and	ict quality assurance manager	High	Low	High

Skill	Job profile	Degree of specialisation	Degree of knowledge	Demand from labour market
dependability capabilities) and how changes in conditions, operations, or the environment will affect these outcomes				
skill in recognizing and categorizing types of vulnerabilities and associated attacks	ict quality assurance manager	Medium	Low	Low
skill in using security event correlation tools	ict quality assurance manager	High	Low	Low
skill in reviewing logs to identify evidence of past intrusions	ict quality assurance manager	High	Low	Low
skill in using public-key infrastructure (pki) encryption and digital signature capabilities into applications (e.g., s/mime email, ssl traffic)	ict quality assurance manager	Low	Low	Low
skill to anticipate new security threats	ict resilience manager	High	Low	Low
skill in creating policies that reflect system security objectives	ict resilience manager	High	Medium	Low
skill in determining how a security system should work (including its resilience and dependability capabilities) and how changes in conditions, operations, or the environment will affect these outcomes	ict security manager	High	Medium	Low
skill in using multiple analytic tools, databases, and techniques (e.g., analyst's notebook, a-space, anchory, m3, divergent/convergent thinking, link charts, matrices, etc.)	ict security manager	High	Low	Low
skill in using public-key infrastructure (pki) encryption and digital signature capabilities into applications (e.g., s/mime email, ssl traffic)	ict security manager	High	Low	Low
skill to respond and take local actions in response to threat sharing alerts from service providers"	ict security manager	High	Low	Low

Skill	Job profile	Degree of specialisation	Degree of knowledge	Demand from labour market
skill to apply cybersecurity and privacy principles to organizational requirements (relevant to confidentiality, integrity, availability, authentication, non-repudiation)	ict system developer	High	Medium	Low
skill in reviewing logs to identify evidence of past intrusions	ict system developer	High	Low	Low
skill in applying confidentiality, integrity, and availability principles	ict trainer	High	Low	Low
skill in performing packet-level analysis	ict trainer	High	Low	Low
skill in configuring and utilizing network protection components (e.g., firewalls, vpns, network intrusion detection systems)	ict trainer	High	Low	Low
skill in reverse engineering (e.g., hex editing, binary packaging utilities, debugging, and strings analysis) to identify function and ownership of remote tools	ict trainer	High	Low	Low
skill in developing and executing technical training programs and curricula	ict trainer	High	Low	Low
skill to apply cybersecurity and privacy principles to organizational requirements (relevant to confidentiality, integrity, availability, authentication, non-repudiation)	information systems security developer	High	High	Low
skill in developing and applying security system access controls	information systems security developer	High	High	Low
skill in evaluating the adequacy of security designs	information systems security developer	High	High	Low
skill in conducting research using all available sources (including deep web)	knowledge engineer	High	Low	Medium
skill in applying analytical methods typically employed to	partner integration planner	High	Medium	Low

Skill	Job profile	Degree of specialisation	Degree of knowledge	Demand from labour market
support planning and to justify recommended strategies and courses of action				
skill to apply cybersecurity and privacy principles to organizational requirements (relevant to confidentiality, integrity, availability, authentication, non-repudiation)	production engineering technician	High	Low	Low
skill in conducting test event and secure test plan design (e. g. unit, integration, system, acceptance)	production engineering technician	High	Low	Low
skill to apply cybersecurity and privacy principles to organizational requirements (relevant to confidentiality, integrity, availability, authentication, non-repudiation)	secure software assessor	High	Medium	Low
skill in developing and applying security system access controls	secure software assessor	High	Medium	Low
skill in using public-key infrastructure (pki) encryption and digital signature capabilities into applications (e.g., s/mime email, ssl traffic)	secure software assessor	Low	Low	Low
skill to apply cybersecurity and privacy principles to organizational requirements (relevant to confidentiality, integrity, availability, authentication, non-repudiation)	security architect	High	Medium	High
skill in determining how a security system should work (including its resilience and dependability capabilities) and how changes in conditions, operations, or the environment will affect these outcomes	security architect	High	Medium	High
skill in using public-key infrastructure (pki) encryption and digital signature capabilities	security architect	Low	Low	Low

Skill	Job profile	Degree of specialisation	Degree of knowledge	Demand from labour market
into applications (e.g.,s/mime email, ssl traffic)				
skill in assessing the application of cryptographic standards	security architect	High	Medium	Medium
skill in determining how a security system should work (including its resilience and dependability capabilities) and how changes in conditions, operations, or the environment will affect these outcomes	security manager	High	Medium	Medium
skill in creating policies that reflect system security objectives	security manager	High	Medium	Medium
skill to apply cybersecurity and privacy principles to organizational requirements (relevant to confidentiality, integrity, availability, authentication, non-repudiation)	software developer	Low	Low	Low
skill in creating policies that reflect system security objectives	software developer	Medium	Low	Low
skill in developing and applying security system access controls	software developer	High	Medium	High
skill in evaluating the adequacy of security designs	software developer	High	Low	Medium
skill in using public-key infrastructure (pki) encryption and digital signature capabilities into applications (e.g., s/mime email, ssl traffic)	software developer	High	Medium	High
skill to apply cybersecurity and privacy principles to organizational requirements (relevant to confidentiality, integrity, availability, authentication, non-repudiation)	systems security analyst	High	Low	Low
skill in determining how a security system should work (including its resilience and dependability capabilities) and how changes in conditions,	systems security analyst	High	Low	Low

Skill	Job profile	Degree of specialisation	Degree of knowledge	Demand from labour market
operations, or the environment will affect these outcomes				
skill in developing and applying security system access controls	systems security analyst	High	Low	Low
skill in evaluating the adequacy of security designs	systems security analyst	High	Low	Low
skill in using multiple analytic tools, databases, and techniques (e.g., analyst's notebook, a-space, anchory, m3, divergent/convergent thinking, link charts, matrices, etc.)	target developer	Low	Low	Low
skill in analyzing essential network data (e.g., router configuration files, routing protocols), network traffic capacity and performance characteristics	target network analyst	High	Low	Low
skill in conducting social network analysis, buddy list analysis, and/or cookie analysis	target network analyst	High	Low	Low

Table 10 - Classification of skills for the Cybersecurity domain.

3. Job profiles prioritization

All the job profiles have been used to measure the *degree of knowldege*, the *degree of specialization* and the *labour market demand* of each skill related to the emerging technologies identified in a given domain.

The aggregation of these measures allows to classify the job profiles with the purpose to identify the top 10 jobs to properly respond to the fast-evolving needs of the labour market. The classification is reported in the following Table 11. Moreover, the description of the job profile, as derived from the repositories of ESCO and NICE, is included in this table.

JOB TITLE	JOB DESCRIPTION	DOMAIN
Aerospace Engineer	Aerospace engineers develop, test and oversee the manufacture of flight vehicles such as aircrafts, missiles, and spacecrafts. The field of engineering they are active in, can be divided into two branches: aeronautical engineering and astronautical engineering. (ESCO)	AI
Biometrician	Biometricians perform research in the field of biometrics. They carry statistical or biological research projects by measuring fingerprints, retinas, and human shapes for medical or industrial applications. (ESCO)	AI
Computer Hardware Engineer	Computer hardware engineers design and develop computer hardware systems and components, such as circuit boards, modems, and printers.	AI

JOB TITLE	JOB DESCRIPTION	DOMAIN
	They draught blueprints and assembly drawings, develop and test the prototypes, and supervise the production process. (ESCO)	
Database Designer	Database designers specify the database's logical structure, processes, and information flows. They design data models and databases to serve data acquisition. (ESCO)	AI
Enterprise Architect	Enterprise architects balance technological opportunities with business requirements. They also maintain a holistic view of the organisation's strategy, processes, information and ICT assets and link the business mission, strategy and processes to the ICT strategy. (ESCO)	AI
Marine Engineer	Marine engineers design, build, maintain and repair the hull, mechanical, electronic equipment and auxiliary systems such as engines, pumps, heating, ventilation, generator sets. They work on all types of boats from pleasure crafts to naval vessels, including submarines. (ESCO)	AI
Optoelectronic Engineer	Optoelectronic engineers design and develop optoelectronic systems and devices, such as UV sensors, photodiodes, and LEDs. Optoelectronic engineering combines optical engineering with electronic engineering in the design of these systems and devices. They conduct research, perform analysis, test the devices, and supervise the research. (ESCO)	AI
Software Analyst	Software analysts elicit and prioritise user requirements, produce and document software specifications, test their application, and review them during software development. They act as the interface between the software users and the software development team. (ESCO)	AI
Software Architect	Software architects create the technical design and the functional model of a software system, based on functional specifications. They also design the architecture of the system or different modules and components related to the business' or customer requirements, technical platform, computer language or development environment. (ESCO)	AI
Telecommunications Engineering Technician	Telecommunications engineering technician deploy, maintain and monitor a telecommunication system that provides interactions between data and voice communications, such as telephone, video conferencing, computer, and voicemail systems. They are also involved in the design, manufacturing, construction, maintenance and repair of telecommunication systems. Telecommunications engineering technicians provide technical assistance in the research and development of telecommunication equipment. (ESCO)	AI
Aviation Communications And Frequency Coordination Manager	Aviation communications and frequency coordination managers are in charge of activities and projects aimed to enable the appropriate communication infrastructure that supports the exchange of information between airspace users. (ESCO)	C4ISTAR
Aviation Surveillance And Code Coordination Manager	Aviation surveillance and code coordination manager ensures that all components of surveillance infrastructures, both ground and airborne, operate in a safe, cohesive and interoperable manner. (ESCO)	C4ISTAR
Broadcast Technician	Broadcast technicians install, start up, maintain, monitor and repair equipment used for the transmission and reception of television and radio broadcast signals. They ensure that all materials are available in a suitable format of transmittable quality according to the transmission	C4ISTAR

JOB TITLE	JOB DESCRIPTION	DOMAIN
	deadline. Broadcast technicians also maintain and repair this equipment. (ESCO)	
Data Scientist	Data scientists find and interpret rich data sources, manage large amounts of data, merge data sources, ensure consistency of data-sets, and create visualisations to aid in understanding data. They build mathematical models using data, present and communicate data insights and findings to specialists and scientists in their team and if required, to a non-expert audience, and recommend ways to apply the data. (ESCO)	C4ISTAR
Database Administrator	Database administrators test, implement and administer computer databases. They use their expertise in database management systems to plan, coordinate and implement security measures to safeguard computer databases. They also use scripts and configuration files to tailor a database to users' needs. (ESCO)	C4ISTAR
Ict Auditor Manager	ICT auditor managers monitor ICT auditors responsible for auditing information systems, platforms, and operating procedures in accordance with established corporate standards for efficiency, accuracy and security. They evaluate ICT infrastructure in terms of risk to the organisation and establish controls to mitigate loss. They determine and recommend improvements in the current risk management controls and in the implementation of system changes or upgrades. (ESCO)	C4ISTAR
Ict Capacity Planner	ICT capacity planners ensure that the capacity of ICT services and ICT infrastructure is able to deliver agreed service level targets in a cost effective and timely manner. They also consider all resources required to deliver the appropriate ICT service, and plan for short, medium, and long term business requirements. (ESCO)	C4ISTAR
Ict System Administrator	ICT system administrators are responsible for the upkeep, configuration, and reliable operation of computer and network systems, servers, workstations and peripheral devices. They may acquire, install, or upgrade computer components and software; automate routine tasks; write computer programs; troubleshoot; train and supervise staff; and provide technical support. They ensure optimum system integrity, security, backup and performance. (ESCO)	C4ISTAR
Operations Manager	Operations managers plan, oversee and coordinate the daily operations of production of goods and provision of services. They also formulate and implement company policies and plan the use of human resources and materials. (ESCO)	C4ISTAR
Software Architect	Software architects create the technical design and the functional model of a software system, based on functional specifications. They also design the architecture of the system or different modules and components related to the business' or customer requirements, technical platform, computer language or development environment. (ESCO)	C4ISTAR
Chief Ict Security Officer	Chief ICT security officers protect company and employee information against unauthorized access. They also define the Information System security policy, manage security deployment across all Information Systems and ensure the provision of information availability. (ESCO)	Cybersecurity
Cyber Defense Analyst	Uses data collected from a variety of cyber defense tools (e.g., IDS alerts, firewalls, network traffic logs) to analyze events that occur within their environments for the purposes of mitigating threats. (NICE)	Cybersecurity

JOB TITLE	JOB DESCRIPTION	DOMAIN
Cyber Defense Incident Responder	Investigates, analyzes, and responds to cyber incidents within the network environment or enclave. (NICE)	Cybersecurity
Cyber Defense Infrastructure Support Specialist	Tests, implements, deploys, maintains, and administers the infrastructure hardware and software. (NICE)	Cybersecurity
Data Analyst	Data analysts import, inspect, clean, transform, validate, model, or interpret collections of data with regard to the business goals of the company. They ensure that the data sources and repositories provide consistent and reliable data. Data analysts use different algorithms and IT tools as demanded by the situation and the current data. They might prepare reports in the form of visualisations such as graphs, charts, and dashboards. (ESCO)	Cybersecurity
Enterprise Architect	Enterprise architects balance technological opportunities with business requirements. They also maintain a holistic view of the organisation's strategy, processes, information and ICT assets and link the business mission, strategy and processes to the ICT strategy. (ESCO)	Cybersecurity
Information Systems Security Developer	Designs, develops, tests, and evaluates information system security throughout the systems development life cycle. (NICE)	Cybersecurity
Knowledge Engineer	Knowledge engineers integrate structured knowledge into computer systems (knowledge bases) in order to solve complex problems normally requiring a high level of human expertise or artificial intelligence methods. They are also responsible for eliciting or extracting knowledge from information sources, maintaining this knowledge, and making it available to the organisation or users. To achieve this, they are aware of knowledge representation and maintenance techniques (rules, frames, semantic nets, ontologies) and use knowledge extraction techniques and tools. They can design and build expert or artificial intelligence systems that use this knowledge. (ESCO)	Cybersecurity
Security Architect	Ensures that the stakeholder security requirements necessary to protect the organization's mission and business processes are adequately addressed in all aspects of enterprise architecture including reference models, segment and solution architectures, and the resulting systems supporting those missions and business processes. (NICE)	Cybersecurity
Security Manager	Security managers ensure security for people, such as customers and employees, and company's assets either fixed, movable, machines, vehicles, and real state. They ensure safety and security by enforcing security policies, keeping track of different events, implementing security protocols, creating emergency response procedures, conducting security evaluations, and supervising security staff members. (ESCO)	Cybersecurity

Table 11 - Top 10 job profiles per domain with descriptions.

This classification has been revised and validated by the industrial partners with the purpose to identify the most relevant job profiles to be addressed in the education and training progrmans design. The final classification is reported in the Table 12.

MOST RELEVANT JOB PROFILES	DOMAIN
Aerospace Engineer, Database Designed, Marine Engineer, Software Analyst	AI
Software Architect	AI and C4ISTAR
Data Scientist, Database Administrator, Ict System Administrator, Optoelectronic Engineer	C4ISTAR
Chief Ict Security Officer, Cyber Defense Analyst, Cyber Defense Incident Responder, Information Systems Security Developer, Security Architect	Cybersecurity

Table 12 - Most relevant job profiles per domain.

4. Conclusions

The values of the classification will give information about the design of the training courses, in particular:

- The degree of specialisation and the degree of knowledge may suggest the level of detail of the educational programmes;
- The demand from labour market gives information on the importance of the skill: if it is emerging it is necessary to focus the courses on this topic, instead if it is disappearing it is not worth building a course for this skill.

This classification can be used to estimate the relevance of the job profiles within each technological domain in the Defence Sector, therefore the most important job profiles has been highlighted and then selected with the support of the industrial partners of the ASSETs+ Consortium.

Final Consideration on Cybersecurity Domain

Cybersecurity issues can be treated alone or in combination of other technological domains. In the first case, there are specific job profiles (e.g., chief ICT security officer) and skills (e.g., using one-way hash functions) that may be relevant in themselves, to prepare future defense professionals with a particular cybersecurity profile. Nevertheless, the ASSETS+ project has an intrinsic cross-domain spirit, and it has been shown that cybersecurity has strong links with other technologies such as artificial intelligence. Indeed, some cybersecurity skills are generic enough (e.g., recognizing and categorizing types of vulnerabilities and associated attacks) to be applied to any of the technologies considered in this project.

In line with the original proposal, any upcoming training and upskilling programme should address cybersecurity issues. The results on the skills at stake are favourable to this goal, as many skills refer to organizational issues (e.g., skill to apply cybersecurity and privacy principles to organizational requirements) or widespread technologies (e.g., skill in securing network communications).

Considering the selected cybersecurity skillset, the demand from labour market is generally low (which is in line with expectations due to the high concreteness of the considered job profiles). However, high-level occupations (e.g., security architect) and those related to handling massive amounts of data or developing software are in the rise. Most of the times, the required degree of knowledge is intermediate. This

contributes to the approach proposed above -- addressing cybersecurity as an independent (but linked) learning unit of future courses.

One important matter is that cybersecurity must be treated from a dual role -- attacker and defender. The underlying spirit of ASSETS+ is on increasing the defense capabilities, but in what comes to cybersecurity, knowing the attacker capabilities and resources is more than advisable. Only under this perspective it is possible to gain holistic and comprehensive knowledges, skills and abilities useful for the defense sector. For example, the skill "evaluating the adequacy of security designs" will be better acquired when a wide overview of potential attacks has already been presented. Therefore, while training "for attacking" is against the own spirit of ASSETS+, training "with attackers in mind" is mandatory.

References

[1] Policy paper: The European Defence Fund - a game changer for European defence industrial collaboration

[2] De Spiegeleire, Stephan, Matthijs Maas, and Tim Sweijs. Artificial Intelligence and the Future of Defense: Strategic Implications for Small-and Medium-Sized Force Providers. The Hague Centre for Strategic Studies, 2017.

[3] Azim, Syed, et al. "The importance of soft skills in complex projects." International Journal of Managing Projects in Business (2010).

[4] Lippman, Laura H., et al. "Workforce Connections: Key "soft skills" that foster youth workforce success: toward a consensus across fields." Washington, DC: Child Trends (2015).

[5] Paper: A Policy-based Approach to Automated Data Reduction for Intelligence, Surveillance, and Reconnaissance Systems

[6] Report: Exploring Europe's capability requirements for 2035 and beyond

[7] Report: The Aerospace and Defence Industries Association of Europe 2019 Facts & Figures

[8] Skills defined considering the ESCO database, available at: https://ec.europa.eu/esco/portal/skill?uri=http%3A%2F%2Fdata.europa.eu%2Fesco%2Fskill%2FS2&conceptLanguage=it&full=true#&uri=http://data.europa.eu/esco/skill/S2

[9] NATO STANDARD ADatP-34(L) / Version 12 NATO Interoperability Standards and Profiles. Avalilable at https://nhqc3s.hq.nato.int/Apps/Architecture/NISP/pdf/NISP-v12-release.pdf

[10] Glinz, M. (2007, October). On non-functional requirements. In 15th IEEE International Requirements Engineering Conference (RE 2007) (pp. 21-26). IEEE.

[11] Alberts, D. S. (2007). Agility, focus, and convergence: The future of command and control. Office of the Assistant Secretary of Defense for Networks and Information Integration Washington DC.

[12] Vassiliou, M. S., Alberts, D. S., & Agre, J. R. (2014). C2 re-envisioned: the future of the enterprise. CRC Press.

[13] Haghighat, M., Abdel-Mottaleb, M., & Alhalabi, W. (2016). Discriminant correlation analysis: Real-time feature level fusion for multimodal biometric recognition. IEEE Transactions on Information Forensics and Security, 11(9), 1984-1996.

[14] Document: C3 TAXONOMY BASELINE 3.1 ed. 2019 CONSULTATION, COMMAND AND CONTROL BOARD (C3B)

[15] From ESCO database: https://ec.europa.eu/esco/portal/skill?uri=http%3A%2F%2Fdata.europa.eu%2Fesco%2Fskill%2FS1.8&conceptLanguage=en&full=true#&uri=http://data.europa.eu/esco/skill/S1.8#&uri=http://data.europa.eu/esco/skill/S2

[16] Alberts, D. S., Huber, R. K., & Moffat, J. (2010). NATO NEC C2 maturity model. OFFICE OF THE ASSISTANT SECRETARY OF DEFENSE WASHINGTON DC COMMAND AND CONTROL RESEARCH PROGRAM (CCRP).

[17] From ESCO database: https://ec.europa.eu/esco/portal/skill?uri=http%3A%2F%2Fdata.europa.eu%2Fesco%2Fskill%2FS1.8&conceptLanguage=en&full=true#&uri=http://data.europa.eu/esco/skill/S1.8#&uri=http://data.europa.eu/esco/skill/S2

[18] EC to build partner network of cybersecurity experts. Available at: joinup.ec.europa.eu/collection/egovernment/news/cybersecurity-atlas , last access April 2021

[19] European Union Agency for Cybersecurity, ENISA. https://www.enisa.europa.eu/ , last access July 2020

[20] European Skills/Competences, qualification and Occupations (ESCO). https://ec.europa.eu/esco/portal/home , last access July 2020

[21] Regulation (eu) 2019/881 of the european parliament and of the council of 17 april 2019 on ENISA and on information and communications technology cybersecurity certification (Cybersecurity Act), 2019.

[22] e-Competence Framework (e-CF) 4.0, European Committee for Standardisation (CEN). www.ecompetences.eu/ , last access April 2021

[23] European Cybersecurity Centres of Expertise Map - Definitions and Taxonomy. Joint Research Centre (JRC). ec.europa.eu/jrc/en/publication/european-cybersecurity-centres-expertise-map-definitions-and-taxonomy , last access April 2021

[24] ENISA (2020), Cybersecurity skills development in the EU, https://www.enisa.europa.eu/publications/the-status-of-cyber-security-education-in-the-european-union, last access May 2021

[25] ENISA (2020), Ad-hoc working group on the European Cybersecurity Skills Framework, https://www.enisa.europa.eu/topics/cybersecurity-education/european-cybersecurity-skills-framework/adhoc_wg_calls, last access May 2021

[26] National Initiative for Cybersecurity Education (NICE) Cybersecurity Workforce Framework (NIST Special Publication 800-181), National Institute of Standards and Technology, 2017.

[27] WEF skills: https://www.coorpacademy.com/en/blog/learning-innovation-en/world-economic-forum-the-soft-skills-to-prepare-employees-for-the-future-of-work/

With the support of the Erasmus+ Programme of the European Union

Appendix 1: List of companies

This appendix contains the full list of companies for which defence related job offers and skills requirements were analysed in the defence sector.

ACMAT	SAAB
Aero Vodochody	Sapienza Consulting
Airbus Defence and Space	Science [&] Technology
ALTEN LTD	SeeByte
Altran	SES Satellites
Amentum	Sitec
ANALOG DEVICES	Smiths Interconnect
Atomic Design	Space Applications Services
BAE Systems	Stream
Bethan McAulay	STS Defence
Boeing	TELECOMSYS
Booz Allen Hamilton	Thales
Cirrus Selection Limited	Vitrociset Belgium
ESA	
European Space Agency	
g2 Recruitment Solutions	
HELLSICHT GmbH	
Hensoldt	
INTRACOM DEFENSE	
Leonardo	
MASS Consultants	
MBDA	
QinetiQ	
Raytheon Technologies	
Redu Space Services	
Rheinmetall Protection Systems	

With the support of the
Erasmus+ Programme
of the European Union

With the support of the Erasmus+ Programme of the European Union

Appendix 2: Insight on the influence of gender, age, non-cognitive skills and personality in defence careers

This appendix contains an insight on the influence of gender, age, non-cognitive skills and personality in defence careers.

Several personal and social factors could influence the behavior of workers in choosing a defence or civil careers. This is an element to consider in the design of the educational programmes in order to understand who the target audience of the courses will be.

The job seekers usually try to find a work that fit with their own objective and interests. E. Pema et al. (2016) examine data on job applicants to the US Military to explore the mechanism by which individuals' personalities influence the formation of job match expectations. The study leads to discover how the portfolio of ability influences employment decisions. They found that the non-cognitive skills differs between the ones who select military careers and the others who choose civilian work: the former are antagonistic, optimistic, intellectually efficient, and submissive, they also tend to comply with rules, but have low self-control; the latter are more socially oriented (extraverted), more organized, and more achievement oriented.

Moreover, there are age and gender-based differences in these two alternative decisions. The age is an important factor because on one hand older applicant have more experience in the labor market more awareness of their skills, so they will be less affected by their own personality; on the other hand, youngest applicants are less informed and more influenced. The gender is an element to consider because "gender equality is expected to continue to improve in developed countries and women are expected to become increasingly active participants in frontline combat and military leadership roles" (Report: Exploring Europe's capability requirements for 2035 and beyond). E. Pema et al. report what are the personality traits that influence more the men or the women: sociability is negatively related to enlistment for women but has no effect for men; also, the enlistment effects of achievement and self-control are negative and significant for men but insignificant for women; finally, cooperation has a positive effect only for men, whereas tolerance is significant only for women.

To explore in deeper the study: Pema, E., Mehay, S., & Tick, S. (2017). Noncognitive skills and job match: evidence from military applicants. *Defence and Peace Economics*, *28*(5), 511-533.

With the support of the
Erasmus+ Programme
of the European Union

Appendix 3: Skills of the Robotics, AI and autonomous-systems domain

This appendix contains the full list of skills extracted in the Robotics, AI and autonomous-systems domain. The appendix is structured as following: (1) the list of job offers; (2) the list of skills obtained with the survey to the defence companies (3) the final filtered list of skills in the field.

With the support of the Erasmus+ Programme of the European Union

List of job offers

No	Company name	Position	Requirements - Skills	Keyword
001O	Amentum	Engineering and Technical Assurance Manager	Proven post-qualification experience in design engineering / construction environment	Artificial Intelligence Engineer
001O	Amentum	Engineering and Technical Assurance Manager	Strong written and verbal communication skills and relationship management	Artificial Intelligence Engineer
001O	Amentum	Engineering and Technical Assurance Manager	Proficient in MS Office and Visio	Artificial Intelligence Engineer
001O	Amentum	Engineering and Technical Assurance Manager	SC security clearance (if not currently held, no known impediments to securing SC clearance)	Artificial Intelligence Engineer
002O	N/D	AI Software Engineer	Experienced in AI development of deep learning & machine learning algorithms	Artificial Intelligence Engineer
002O	N/D	AI Software Engineer	Strong coding skills in languages such as C/C++ and Python	Artificial Intelligence Engineer
003O	Raytheon Technologies	AI Developer	Strong programming skills and experience with Java and/or C++	Artificial Intelligence Engineer
003O	Raytheon Technologies	AI Developer	Experience with machine learning frameworks and analytic tools such as Tensorflow, Torch, PyTorch, etc.	Artificial Intelligence Engineer
003O	Raytheon Technologies	AI Developer	Passion for software engineering practices	Artificial Intelligence Engineer
003O	Raytheon Technologies	AI Developer	Creative problem solving and ability to build rapid prototypes	Artificial Intelligence Engineer
003O	Raytheon Technologies	AI Developer	Excellent communication skills	Artificial Intelligence Engineer
003O	Raytheon Technologies	AI Developer	Experience with reinforcement learning techniques	Artificial Intelligence Engineer
003O	Raytheon Technologies	AI Developer	Experience with designing and prototyping, training, and evaluating machine learning methods	Artificial Intelligence Engineer
003O	Raytheon Technologies	AI Developer	Experience with symbolic or rule-based AI systems	Artificial Intelligence Engineer
003O	Raytheon Technologies	AI Developer	Experience with autonomous robotics platforms (UAVs, UGVs), sensors and actuators	Artificial Intelligence Engineer

With the support of the Erasmus+ Programme of the European Union

No	Company name	Position	Requirements - Skills	Keyword
003O	Raytheon Technologies	AI Developer	Experience with computer vision, lidar, point clouds, and/or photogrammetry techniques.	Artificial Intelligence Engineer
003O	Raytheon Technologies	AI Developer	Experience with human-machine interfaces	Artificial Intelligence Engineer
004O	Booz Allen Hamilton	Senior Machine Learning Engineer and Algorithm Designer	7+ years of experience in a Big Data, analytics, data science, machine learning, or artificial intelligence technical delivery role, including data scientist, developer, architect, engineer, mathematician, statistician, or machine learning specialist	Artificial Intelligence Engineer
004O	Booz Allen Hamilton	Senior Machine Learning Engineer and Algorithm Designer	5+ years of experience with leading or managing delivery teams, projects, development efforts, or research efforts and traditional and Agile framework project management approaches and constructs	Artificial Intelligence Engineer
004O	Booz Allen Hamilton	Senior Machine Learning Engineer and Algorithm Designer	3+ years of experience with programming, including machine learning frameworks, such as TensorFlow, Keras, PyTorch, Caffe, and MXNET	Artificial Intelligence Engineer
004O	Booz Allen Hamilton	Senior Machine Learning Engineer and Algorithm Designer	3+ years of experience with business development, client or customer relationship management, proposal development, or grant applications	Artificial Intelligence Engineer
004O	Booz Allen Hamilton	Senior Machine Learning Engineer and Algorithm Designer	Experience with programming languages, including Python, R, SQL, or Java	Artificial Intelligence Engineer
004O	Booz Allen Hamilton	Senior Machine Learning Engineer and Algorithm Designer	Experience with Big Data technologies, including HDFS, Hadoop, or Spark	Artificial Intelligence Engineer
004O	Booz Allen Hamilton	Senior Machine Learning Engineer and Algorithm Designer	Experience with manipulating data and ETL in parallel processing and distributed computing environments	Artificial Intelligence Engineer
004O	Booz Allen Hamilton	Senior Machine Learning Engineer and Algorithm Designer	Experience with supervised and unsupervised machine learning algorithms and with designing and executing machine learning models and applications	Artificial Intelligence Engineer

With the support of the Erasmus+ Programme of the European Union

No	Company name	Position	Requirements - Skills	Keyword
004O	Booz Allen Hamilton	Senior Machine Learning Engineer and Algorithm Designer	TS/SCI clearance required	Artificial Intelligence Engineer
004O	Booz Allen Hamilton	Senior Machine Learning Engineer and Algorithm Designer	Experience with machine learning techniques and their application, including deep learning, such as CNN, RNN, and transfer learning, NLP, gradient-boosted trees, Neural Machine Translation (NMT), and reinforcement learning	Artificial Intelligence Engineer
004O	Booz Allen Hamilton	Senior Machine Learning Engineer and Algorithm Designer	Experience with using ArcGIS or other commercial GIS programs for spatial analysis	Artificial Intelligence Engineer
004O	Booz Allen Hamilton	Senior Machine Learning Engineer and Algorithm Designer	Experience with developing applications using API functionality	Artificial Intelligence Engineer
004O	Booz Allen Hamilton	Senior Machine Learning Engineer and Algorithm Designer	Ability to show a public GitHub repository, Blog, or Kaggle account showcasing developed machine learning models	Artificial Intelligence Engineer
005O	Sitec	Senior CS&A Engineer	Degree Qualified (BEng or MEng), Civil / Structural Engineer	Artificial Intelligence Engineer
005O	Sitec	Senior CS&A Engineer	Chartered or Incorporated Engineer with membership of ICE or IStructE, or working toward full membership of ICE or IStructE	Artificial Intelligence Engineer
005O	Sitec	Senior CS&A Engineer	Significant experience in the design of structures in reinforced concrete and steelwork	Artificial Intelligence Engineer
005O	Sitec	Senior CS&A Engineer	Advantageous but not necessary to have previous experience within the nuclear industry and design for seismic loading.	Artificial Intelligence Engineer
005O	Sitec	Senior CS&A Engineer	Awareness and experience of using the latest design codes and standards.	Artificial Intelligence Engineer
005O	Sitec	Senior CS&A Engineer	Understanding of the relevant legal and regulatory standards.	Artificial Intelligence Engineer
006O	N/D	AI Software Engineer	Qualified to degree level in a relevant subject	Artificial Intelligence Engineer
006O	N/D	AI Software Engineer	3 years commercial software experience using C. C, Python	Artificial Intelligence Engineer
006O	N/D	AI Software Engineer	AI / Deep Learning software Development (beneficial)	Artificial Intelligence Engineer
006O	N/D	AI Software Engineer	Machine Learning algorithm development	Artificial Intelligence Engineer
006O	N/D	AI Software Engineer	Source control management (GIT and SVN) Desirable	Artificial Intelligence Engineer

With the support of the Erasmus+ Programme of the European Union

No	Company name	Position	Requirements - Skills	Keyword
006O	N/D	AI Software Engineer	Experience developing Android and / or IOS mobile applications	Artificial Intelligence Engineer
006O	N/D	AI Software Engineer	JavaScript Knockout	Artificial Intelligence Engineer
006O	N/D	AI Software Engineer	Agile	Artificial Intelligence Engineer
007O	STS Defence	Senior Engineer - Nuclear Instructor	Ability and desire to teach and inspire an audience on STEM related subjects	Artificial Intelligence Engineer
007O	STS Defence	Senior Engineer - Nuclear Instructor	Proven engineering and/or academicknowledge within a nuclear and/or submarineenvironment	Artificial Intelligence Engineer
007O	STS Defence	Senior Engineer - Nuclear Instructor	Exceptional communication and interpersonal skills to enable effective and engaging communication at all levels, including in the classroom environment.	Artificial Intelligence Engineer
007O	STS Defence	Senior Engineer - Nuclear Instructor	Computer literacy with an emphasis on Microsoft Office applications	Artificial Intelligence Engineer
007O	STS Defence	Senior Engineer - Nuclear Instructor	Ability and willingness to travel to customer sites across the UK	Artificial Intelligence Engineer
007O	STS Defence	Senior Engineer - Nuclear Instructor	A commitment to your own Continuous Professional Development	Artificial Intelligence Engineer
007O	STS Defence	Senior Engineer - Nuclear Instructor	The ability to gain SC clearance	Artificial Intelligence Engineer
007O	STS Defence	Senior Engineer - Nuclear Instructor	Experience of conducting training analysis, design and development of training material for nuclear or high-hazard industry environments	Artificial Intelligence Engineer
007O	STS Defence	Senior Engineer - Nuclear Instructor	Relevant defence or civil nuclear safety knowledge	Artificial Intelligence Engineer
007O	STS Defence	Senior Engineer - Nuclear Instructor	Experience of working within the nuclear submarine environment	Artificial Intelligence Engineer
007O	STS Defence	Senior Engineer - Nuclear Instructor	Professional development in a nuclear or training management related discipline	Artificial Intelligence Engineer
007O	STS Defence	Senior Engineer - Nuclear Instructor	Professional Registration with Engineering Council approved body (or a willingness to work towards this)	Artificial Intelligence Engineer
007O	STS Defence	Senior Engineer - Nuclear Instructor	Knowledge of Defence Instructional Techniques, Defence Train the Trainer, E&T Level 3 or Higher Level educational qualification (E&T Level 4/Cert Ed/PGCE)	Artificial Intelligence Engineer

With the support of the Erasmus+ Programme of the European Union

No	Company name	Position	Requirements - Skills	Keyword
008O	Raytheon Technologies	Sr. Engineering Logistics Specialist II	Demonstrated ability to plan, organize, coordinate, integrate, execute, and manage all logistics tasks and to analyze and resolve logistics problems relating to operational considerations.	Artificial Intelligence Engineer
008O	Raytheon Technologies	Sr. Engineering Logistics Specialist II	Demonstrated skills to include analyzing engineering/systems management data, developing logistics plans and procedures, developing logistics management plans and guidelines.	Artificial Intelligence Engineer
008O	Raytheon Technologies	Sr. Engineering Logistics Specialist II	Demonstrated ability to perform Failure Reporting, Analysis and Corrective Action (FRACA) analysis to include generating FRACA plans and failure summary reports.	Artificial Intelligence Engineer
008O	Raytheon Technologies	Sr. Engineering Logistics Specialist II	Experience with supporting Failure Review Boards (FRBs), leading Failure Investigation Teams (FITs), and performing root cause analysis to identify corrective actions.	Artificial Intelligence Engineer
008O	Raytheon Technologies	Sr. Engineering Logistics Specialist II	Demonstrated ability to lead and manage teams.	Artificial Intelligence Engineer
008O	Raytheon Technologies	Sr. Engineering Logistics Specialist II	Experience with MIL-HDBK-502, MIL-PRF-49506, MIL-STD-1369, MIL-STD-1388, Integrated Product Support Handbook or equivalent industry standards, practices, or methods.	Artificial Intelligence Engineer
008O	Raytheon Technologies	Sr. Engineering Logistics Specialist II	U.S. Citizen with the ability to obtain and maintain a DoD SECRET Security Clearance.	Artificial Intelligence Engineer
008O	Raytheon Technologies	Sr. Engineering Logistics Specialist II	Experience working with Army Reset & Refurb, Depot Support, and Production facility processes	Artificial Intelligence Engineer
008O	Raytheon Technologies	Sr. Engineering Logistics Specialist II	Self-starter – proactive in determining goals, objectives and pursuing the necessary course of action. Highly motivated, energetic, comfortable with initiating interaction with engineering, management and customers.	Artificial Intelligence Engineer
008O	Raytheon Technologies	Sr. Engineering Logistics Specialist II	Familiar with logistics tools and metrics.	Artificial Intelligence Engineer
008O	Raytheon Technologies	Sr. Engineering Logistics Specialist II	Capable of collecting, organizing, and preparing technical data/documents for review.	Artificial Intelligence Engineer
008O	Raytheon Technologies	Sr. Engineering Logistics Specialist II	Experience with Earned Value Management System (EVMS) principles, e.g., CPI, SPI, TCPI, etc.	Artificial Intelligence Engineer
008O	Raytheon Technologies	Sr. Engineering Logistics Specialist II	Experience conducting trade studies.	Artificial Intelligence Engineer

With the support of the Erasmus+ Programme of the European Union

No	Company name	Position	Requirements - Skills	Keyword
008O	Raytheon Technologies	Sr. Engineering Logistics Specialist II	Experience in preparing Basis of Estimates (BOE).	Artificial Intelligence Engineer
008O	Raytheon Technologies	Sr. Engineering Logistics Specialist II	B.S Degree in Science, Technology, Engineering or Mathematics (STEM) or equivalent experience and 6 years of directly related logistics engineering experience.	Artificial Intelligence Engineer
009O	QinetiQ	Senior Cryptosecurity Engineer	Qualified to at least University Honours Degree or equivalent (minimum upper second class)	Artificial Intelligence Engineer
009O	QinetiQ	Senior Cryptosecurity Engineer	Applicable experience working within the Government security domain.	Artificial Intelligence Engineer
009O	QinetiQ	Senior Cryptosecurity Engineer	Knowledge and experience of crypto or key management development	Artificial Intelligence Engineer
009O	QinetiQ	Senior Cryptosecurity Engineer	Proven experience of working in a consultancy role, focused on customer needs and requirements or equivalent engineering role with customer/stakeholder exposure and influence.	Artificial Intelligence Engineer
009O	QinetiQ	Senior Cryptosecurity Engineer	Proven ability to rapidly interpret customer requirements and understand complex trade-offs in drawing conclusions and recommendations.	Artificial Intelligence Engineer
009O	QinetiQ	Senior Cryptosecurity Engineer	Proven ability to work across a broad spread of technical and project domains, understanding and shaping both the “big picture” and technical details.	Artificial Intelligence Engineer
009O	QinetiQ	Senior Cryptosecurity Engineer	Proven ability to engage with technical experts and incorporate their input into broader technical solutions.	Artificial Intelligence Engineer
009O	QinetiQ	Senior Cryptosecurity Engineer	Excellent verbal and written technical English communications skills.	Artificial Intelligence Engineer
009O	QinetiQ	Senior Cryptosecurity Engineer	Security risk analysis and requirements capture	Artificial Intelligence Engineer
009O	QinetiQ	Senior Cryptosecurity Engineer	Security architectures and technology (hardware, software)	Artificial Intelligence Engineer
009O	QinetiQ	Senior Cryptosecurity Engineer	Systems engineering design and implementation processes	Artificial Intelligence Engineer
010O	N/D	Machine Learning Engineer (Reinforcement Learning)	Python	Artificial Intelligence Engineer

With the support of the Erasmus+ Programme of the European Union

No	Company name	Position	Requirements - Skills	Keyword
010O	N/D	Machine Learning Engineer (Reinforcement Learning)	Wider Machine Learning framework knowledge	Artificial Intelligence Engineer
011O	Boeing	Missions Systems Software Engineer	Developing software for use in real-time or distributed systems	Artificial Intelligence Engineer
011O	Boeing	Missions Systems Software Engineer	Understanding of software and systems test methodologies and best practices	Artificial Intelligence Engineer
011O	Boeing	Missions Systems Software Engineer	Understanding of systems engineering practices and principles	Artificial Intelligence Engineer
011O	Boeing	Missions Systems Software Engineer	Using source code control and document configuration management systems	Artificial Intelligence Engineer
011O	Boeing	Missions Systems Software Engineer	Understanding of technology lifecycles, technology management strategies and development roadmaps	Artificial Intelligence Engineer
011O	Boeing	Missions Systems Software Engineer	Understanding of continuous improvement to process and productivity with practical application	Artificial Intelligence Engineer
011O	Boeing	Missions Systems Software Engineer	Experience in writing technical elements of business documentation	Artificial Intelligence Engineer
011O	Boeing	Missions Systems Software Engineer	Knowledge of Command and Control Systems, Sensor Integration, Communications, Messaging protocols for mission systems	Artificial Intelligence Engineer
011O	Boeing	Missions Systems Software Engineer	Experience developing software for safety critical applications	Artificial Intelligence Engineer
011O	Boeing	Missions Systems Software Engineer	Knowledge of hardware components associated with the implementation of different communications networks (i.e. modems, antennas, etc.)	Artificial Intelligence Engineer
011O	Boeing	Missions Systems Software Engineer	Experience with embedded systems	Artificial Intelligence Engineer
011O	Boeing	Missions Systems Software Engineer	Parallel and GPGPU processing experience	Artificial Intelligence Engineer
011O	Boeing	Missions Systems Software Engineer	Knowledge of methodologies for secure communications and data encryption	Artificial Intelligence Engineer
011O	Boeing	Missions Systems Software Engineer	Familiarity with Cloud Architectures, CICD Automation and DevOps paradigms	Artificial Intelligence Engineer

With the support of the Erasmus+ Programme of the European Union

No	Company name	Position	Requirements - Skills	Keyword
011O	Boeing	Missions Systems Software Engineer	Knowledge of modern C++ principles and practice (C++11/14/17) and C++ frameworks	Artificial Intelligence Engineer
011O	Boeing	Missions Systems Software Engineer	Experience with the latest trends and approaches (e.g. Machine learning/deep learning techniques) for implementation of Artificial Intelligence (AI) and autonomous behaviours	Artificial Intelligence Engineer
011O	Boeing	Missions Systems Software Engineer	Sensing systems (visual, infrared, laser, etc.) and processing techniques	Artificial Intelligence Engineer
012O	Boeing	Experienced Mission Systems Software Engineer	Developing software for complex, real-time, multi-threaded and distributed systems	Artificial Intelligence Engineer
012O	Boeing	Experienced Mission Systems Software Engineer	Employing software and systems test methodologies and best practices	Artificial Intelligence Engineer
012O	Boeing	Experienced Mission Systems Software Engineer	Application of systems engineering practices and principles	Artificial Intelligence Engineer
012O	Boeing	Experienced Mission Systems Software Engineer	Using or implementing source code control and document configuration management systems	Artificial Intelligence Engineer
012O	Boeing	Experienced Mission Systems Software Engineer	Experience in developing technology strategies and roadmaps	Artificial Intelligence Engineer
012O	Boeing	Experienced Mission Systems Software Engineer	Experience in developing and applying continuous improvements to process and productivity	Artificial Intelligence Engineer
012O	Boeing	Experienced Mission Systems Software Engineer	Experience in writing technical elements of bids and proposals in support of generating new business	Artificial Intelligence Engineer
012O	Boeing	Experienced Mission Systems Software Engineer	Knowledge of Command and Control Systems, Sensor Integration, Communications, Messaging protocols for mission systems	Artificial Intelligence Engineer
012O	Boeing	Experienced Mission Systems Software Engineer	Experience developing software for safety critical applications	Artificial Intelligence Engineer
012O	Boeing	Experienced Mission Systems Software Engineer	Knowledge of hardware components associated with the implementation of different communications networks (i.e. modems, antennas, etc.)	Artificial Intelligence Engineer
012O	Boeing	Experienced Mission Systems Software Engineer	Experience with embedded systems	Artificial Intelligence Engineer
012O	Boeing	Experienced Mission Systems Software Engineer	Parallel and GPGPU processing experience	Artificial Intelligence Engineer

With the support of the Erasmus+ Programme of the European Union

No	Company name	Position	Requirements - Skills	Keyword
012O	Boeing	Experienced Mission Systems Software Engineer	Knowledge of methodologies for secure communications and data encryption types.	Artificial Intelligence Engineer
012O	Boeing	Experienced Mission Systems Software Engineer	Familiarity with Cloud Architectures, CICD Automation and DevOps paradigms	Artificial Intelligence Engineer
012O	Boeing	Experienced Mission Systems Software Engineer	Knowledge of modern C++ principles and practice (C++11/14/17) and C++ frameworks	Artificial Intelligence Engineer
012O	Boeing	Experienced Mission Systems Software Engineer	Experience with the latest trends and approaches (e.g. Machine learning/deep learning techniques) for implementation of Artificial Intelligence (AI) and autonomous behaviours	Artificial Intelligence Engineer
012O	Boeing	Experienced Mission Systems Software Engineer	Sensing systems (visual, infrared, laser, etc.) and processing techniques	Artificial Intelligence Engineer
013O	N/D	Senior Software Engineer	Degree in computer science or closely related discipline from a leading university	Artificial Intelligence Engineer
013O	N/D	Senior Software Engineer	At least 5 years and ideally 10 industry experience building software	Artificial Intelligence Engineer
013O	N/D	Senior Software Engineer	Experience architecting multiprocess server systems, including multithreaded processes in C or C	Artificial Intelligence Engineer
013O	N/D	Senior Software Engineer	Experience collaboratively designing software e.g. using UML and design patterns	Artificial Intelligence Engineer
013O	N/D	Senior Software Engineer	Interest and experience in other technologies and languages, ideally including Python	Artificial Intelligence Engineer
013O	N/D	Senior Software Engineer	Cross-platform development for Windows and Linux	Artificial Intelligence Engineer
013O	N/D	Senior Software Engineer	Candidates must be able to secure SC clearance for government projects	Artificial Intelligence Engineer
013O	N/D	Senior Software Engineer	Development for cloud computing technologies such as AWS, Azure or GCP would be a bonus	Artificial Intelligence Engineer
013O	N/D	Senior Software Engineer	Experienced with API design and use, SQL, NoSQL,	Artificial Intelligence Engineer
013O	N/D	Senior Software Engineer	Experience with Docker	Artificial Intelligence Engineer
013O	N/D	Senior Software Engineer	Experience with code optimisation	Artificial Intelligence Engineer
014O	MASS Consultants	Senior Model Engineer	sound grasp of the key principles and techniques of physics and maths-based computer modelling, and a desire to put those skills to work solving technical challenges as part of a team of engineers.	Artificial Intelligence Engineer

With the support of the Erasmus+ Programme of the European Union

No	Company name	Position	Requirements - Skills	Keyword
015O	TELECOMSYS	Sr Engineering SATCOM	Minimum of ten (10) years of experience in support of installations, repair, troubleshooting or maintenance of satellite communications electronic systems or equipment.	Artificial Intelligence Engineer
015O	TELECOMSYS	Sr Engineering SATCOM	Minimum of ten (10) years of experience operating in a tactical satellite environment operating/maintaining antenna controllers, SSPA, LNA/LNB, up and down converters, Fiber optic/Coax/Ethernet Cable, Frequency Division Multiple Access (FDMA) and Time Division Multiple Access (TDMA) modems (satellite modems) and Modem Hub operations.	Artificial Intelligence Engineer
015O	TELECOMSYS	Sr Engineering SATCOM	Prior DoD/Military experience operating and maintaining Secure Mobile Anti-Jam Reliable Tactical Terminals (SMART-T) and Single Channel Anti Jam Man Portable (SCAMP)	Artificial Intelligence Engineer
015O	TELECOMSYS	Sr Engineering SATCOM	Familiarity with EHF Constellation (Milstar and AEHF)	Artificial Intelligence Engineer
015O	TELECOMSYS	Sr Engineering SATCOM	Bachelor's degree in related field, preferred	Artificial Intelligence Engineer
015O	TELECOMSYS	Sr Engineering SATCOM	ACTIVE TOP SECRET Clearance Required	Artificial Intelligence Engineer
016O	Redu Space Services	Engineering & Coordination Support	Master's degree in Aerospace Engineering or equivalent qualification in engineering	Artificial Intelligence Engineer
016O	Redu Space Services	Engineering & Coordination Support	strong interest in education activities in the field of science and technology in general	Artificial Intelligence Engineer
016O	Redu Space Services	Engineering & Coordination Support	Previous experience in teaching or in educational projects would be an asset	Artificial Intelligence Engineer
016O	Redu Space Services	Engineering & Coordination Support	Candidates will be expected to demonstrate good organisational and reporting skills as well as a proactive attitude to problem-solving.	Artificial Intelligence Engineer
016O	Redu Space Services	Engineering & Coordination Support	They should be capable of coordinating multiple projects and provide engineering support.	Artificial Intelligence Engineer
016O	Redu Space Services	Engineering & Coordination Support	They must demonstrate an ability to communicate and cooperate efficiently, to establish and maintain good working relationships with a wide range of ESA staff at different levels as well as with representatives of academia, industry and ESA's international partners.	Artificial Intelligence Engineer
016O	Redu Space Services	Engineering & Coordination Support	English and French.	Artificial Intelligence Engineer

With the support of the Erasmus+ Programme of the European Union

No	Company name	Position	Requirements - Skills	Keyword
017O	Atomic Design	Craft Engineering Specialists	Extensive competency in a single specialism or capability to work across a range of disciplines or work areas	Artificial Intelligence Engineer
017O	Atomic Design	Craft Engineering Specialists	Ability to work as a lead team member including coaching other engineers in specialised roles	Artificial Intelligence Engineer
017O	Atomic Design	Craft Engineering Specialists	Basic computer literacy to utilise relevant business systems (e.g. Asset Management System)	Artificial Intelligence Engineer
017O	Atomic Design	Craft Engineering Specialists	Good interpersonal skills, written and verbal	Artificial Intelligence Engineer
017O	Atomic Design	Craft Engineering Specialists	must have an engineering apprenticeship with a minimum NVQ/Diploma Level 3 in a relevant technical discipline or NVQ/Diploma level 2 plus industrial experience.	Artificial Intelligence Engineer
017O	Atomic Design	Craft Engineering Specialists	You should also have detailed knowledge and working experience of fault-finding techniques and methodologies.	Artificial Intelligence Engineer
017O	Atomic Design	Craft Engineering Specialists	As a subject matter expert within your technical field you will have an in-depth working knowledge of building services, plant, equipment and processes.	Artificial Intelligence Engineer
018O	BAE Systems	Environmental Engineering	Degree qualification in an Environmental or STEM discipline, and have environmental experience in a related field;	Artificial Intelligence Engineer
018O	BAE Systems	Environmental Engineering	Demonstrable experience of undertaking environmental assessments prioritising and managing impacts and risks;	Artificial Intelligence Engineer
018O	BAE Systems	Environmental Engineering	Experience in collating, reviewing, analysing and presenting sound environmental arguments in concise reports;	Artificial Intelligence Engineer
018O	BAE Systems	Environmental Engineering	Understanding of current and emerging environmental legislation	Artificial Intelligence Engineer
018O	BAE Systems	Environmental Engineering	Experience of working with and implementing environmental management systems;	Artificial Intelligence Engineer
018O	BAE Systems	Environmental Engineering	Demonstrable experience in collating, analysing, and presenting environmental arguments in concise technical reports and documenting evidence to support the production of an Environmental Case	Artificial Intelligence Engineer
019O	Space Applications Services	Software Engineer – Mission Control Software Development (M/F)	A Master Degree in Computer Science, Software Engineering or equivalent	Robotics

With the support of the Erasmus+ Programme of the European Union

No	Company name	Position	Requirements - Skills	Keyword
019O	Space Applications Services	Software Engineer – Mission Control Software Development (M/F)	A minimum of 2 years' experience in design and development of software implemented in Java	Robotics
019O	Space Applications Services	Software Engineer – Mission Control Software Development (M/F)	Proven experience with software development lifecycle	Robotics
019O	Space Applications Services	Software Engineer – Mission Control Software Development (M/F)	Good knowledge of Linux systems as a user and administrator:	Robotics
019O	Space Applications Services	Software Engineer – Mission Control Software Development (M/F)	Good understanding of IP networks, firewall, VPN, PKI, routing	Robotics
019O	Space Applications Services	Software Engineer – Mission Control Software Development (M/F)	Open Sources Server environment	Robotics
019O	Space Applications Services	Software Engineer – Mission Control Software Development (M/F)	Python, Django framework, development of enterprise software, modern frontend programming (e.g. ES6, Angular, React, Redux)	Robotics
019O	Space Applications Services	Software Engineer – Mission Control Software Development (M/F)	Designing and developing software implemented in C/C++	Robotics
019O	Space Applications Services	Software Engineer – Mission Control Software Development (M/F)	Real-time systems and communication protocols	Robotics
019O	Space Applications Services	Software Engineer – Mission Control Software Development (M/F)	System deployment and orchestration tools: Docker, Ansible	Robotics
019O	Space Applications Services	Software Engineer – Mission Control Software Development (M/F)	Software models for spacecrafts simulation	Robotics

With the support of the Erasmus+ Programme of the European Union

No	Company name	Position	Requirements - Skills	Keyword
019O	Space Applications Services	Software Engineer – Mission Control Software Development (M/F)	ECSS E-40 standard.	Robotics
019O	Space Applications Services	Software Engineer – Mission Control Software Development (M/F)	A proactive approach, with initiative and ability to work independently	Robotics
019O	Space Applications Services	Software Engineer – Mission Control Software Development (M/F)	Ability to:	Robotics
019O	Space Applications Services	Software Engineer – Mission Control Software Development (M/F)	Synthesise, summarise and draw conclusions	Robotics
019O	Space Applications Services	Software Engineer – Mission Control Software Development (M/F)	Adhere to strict standards of confidentiality	Robotics
019O	Space Applications Services	Software Engineer – Mission Control Software Development (M/F)	Work in distributed international teams	Robotics
019O	Space Applications Services	Software Engineer – Mission Control Software Development (M/F)	Strength to cope with schedules and deadlines	Robotics
019O	Space Applications Services	Software Engineer – Mission Control Software Development (M/F)	Excellent organisational and communication skills	Robotics
019O	Space Applications Services	Software Engineer – Mission Control Software Development (M/F)	Excellent written and spoken English.	Robotics
020O	Altran	Lead Design Engineer (High-Tech)	A Master's Degree in Mechanical Engineering, Aerospace Engineering or equivalent;	Robotics

With the support of the Erasmus+ Programme of the European Union

No	Company name	Position	Requirements - Skills	Keyword
020O	Altran	Lead Design Engineer (High-Tech)	A first experience as a lead designer or technical lead within Precision Mechanics;	Robotics
020O	Altran	Lead Design Engineer (High-Tech)	Experience in client management;	Robotics
020O	Altran	Lead Design Engineer (High-Tech)	Excellent social and communication skills;	Robotics
020O	Altran	Lead Design Engineer (High-Tech)	You have a permanent residence in the Netherlands, or you have an EU-citizenship.	Robotics
021O	MBDA	Navigation Algorithm Design	Relevant experience of Navigation algorithm design.	Robotics
021O	MBDA	Navigation Algorithm Design	Inertial Navigation	Robotics
021O	MBDA	Navigation Algorithm Design	Aided Navigation techniques, for example but not limited to,	Robotics
021O	MBDA	Navigation Algorithm Design	Global Navigation Satellite Systems	Robotics
021O	MBDA	Navigation Algorithm Design	Terrain Referenced Navigation	Robotics
021O	MBDA	Navigation Algorithm Design	Image Based Navigation	Robotics
021O	MBDA	Navigation Algorithm Design	Radar and LADAR imaging	Robotics
021O	MBDA	Navigation Algorithm Design	Opportunistic Navigation / Signals of Opportunity	Robotics
021O	MBDA	Navigation Algorithm Design	Data fusion techniques	Robotics
021O	MBDA	Navigation Algorithm Design	Kalman filters	Robotics
021O	MBDA	Navigation Algorithm Design	Non-linear filtering	Robotics

With the support of the Erasmus+ Programme of the European Union

No	Company name	Position	Requirements - Skills	Keyword
021O	MBDA	Navigation Algorithm Design	Ideally will have knowledge and experience of the following:	Robotics
021O	MBDA	Navigation Algorithm Design	The MathWorks products – specifically Simulink, Embedded MATLAB and Stateflow	Robotics
021O	MBDA	Navigation Algorithm Design	Model Based Design	Robotics
021O	MBDA	Navigation Algorithm Design	Configuration management	Robotics
021O	MBDA	Navigation Algorithm Design	Requirement Management e.g. DOORS and Rhapsody	Robotics
021O	MBDA	Navigation Algorithm Design	C, FORTRAN and Ada	Robotics
021O	MBDA	Navigation Algorithm Design	be pro-active and be capable of working on your own initiative with a minimum of supervision, as well as within an algorithm development team working transversally with other functions	Robotics
021O	MBDA	Navigation Algorithm Design	have an understanding of and an ability to work within defined processes	Robotics
021O	MBDA	Navigation Algorithm Design	have the ability to visualize and analyse complex systems	Robotics
021O	MBDA	Navigation Algorithm Design	have good verbal, presentation and written communication skills	Robotics
021O	MBDA	Navigation Algorithm Design	have practical knowledge of basic systems engineering principles and processes	Robotics
021O	MBDA	Navigation Algorithm Design	be able to work with engineering teams, including in-house and contractor personnel	Robotics
021O	MBDA	Navigation Algorithm Design	have good understanding of, and good working experience in all phases of the engineering life cycle	Robotics
022O	Space Applications Services	Mechatronics and Control Engineer - Space Robotics (M/F)	At least 2 years of professional experience involving software development for control in robotics is required	Robotics

With the support of the Erasmus+ Programme of the European Union

No	Company name	Position	Requirements - Skills	Keyword
022O	Space Applications Services	Mechatronics and Control Engineer - Space Robotics (M/F)	Proficiency with robust control algorithms related to robotics manipulation, haptics and visual servoing	Robotics
022O	Space Applications Services	Mechatronics and Control Engineer - Space Robotics (M/F)	Hands-on experience with robotics software developments and frameworks (ROS, OROCOS, Gazebo, etc.), real-time control and communication (CAN, EtherCAT, etc.), Matlab	Robotics
022O	Space Applications Services	Mechatronics and Control Engineer - Space Robotics (M/F)	Advanced programming skills in C ++, Python	Robotics
022O	Space Applications Services	Mechatronics and Control Engineer - Space Robotics (M/F)	Hands-on experience with complex software architectures assemblies, deployment and testing	Robotics
022O	Space Applications Services	Mechatronics and Control Engineer - Space Robotics (M/F)	Experience with Continuous Integration processes and agile software development	Robotics
022O	Space Applications Services	Mechatronics and Control Engineer - Space Robotics (M/F)	Experience with space communication buses (Spacewire, TTE) is a plus	Robotics
022O	Space Applications Services	Mechatronics and Control Engineer - Space Robotics (M/F)	Proficiency with technical documentations production.	Robotics
022O	Space Applications Services	Mechatronics and Control Engineer - Space Robotics (M/F)	A proactive approach, with initiative and ability to work independently	Robotics
022O	Space Applications Services	Mechatronics and Control Engineer - Space Robotics (M/F)	A hands-on mentality	Robotics
022O	Space Applications Services	Mechatronics and Control Engineer - Space Robotics (M/F)	Synthesize, summarize and draw conclusions	Robotics

With the support of the Erasmus+ Programme of the European Union

No	Company name	Position	Requirements - Skills	Keyword
022O	Space Applications Services	Mechatronics and Control Engineer - Space Robotics (M/F)	Adhere to strict standards of confidentiality	Robotics
022O	Space Applications Services	Mechatronics and Control Engineer - Space Robotics (M/F)	Work in distributed international teams	Robotics
022O	Space Applications Services	Mechatronics and Control Engineer - Space Robotics (M/F)	Strength to cope with schedules and deadlines	Robotics
022O	Space Applications Services	Mechatronics and Control Engineer - Space Robotics (M/F)	Excellent organizational, analytical and communication skills	Robotics
022O	Space Applications Services	Mechatronics and Control Engineer - Space Robotics (M/F)	Excellent written and spoken English	Robotics
022O	Space Applications Services	Mechatronics and Control Engineer - Space Robotics (M/F)	Flexible and capable of working in a fast-paced environment.	Robotics
023O	SeeByte	Image Processing Engineer – Machine Learning Engineer / Senior Engineer	Experience with Machine Learning using C++ and/or Python	Robotics
023O	SeeByte	Image Processing Engineer – Machine Learning Engineer / Senior Engineer	Experience with Deep Neural Networks in scene understanding	Robotics
023O	SeeByte	Image Processing Engineer – Machine Learning Engineer / Senior Engineer	Experience with libraries such as TensorFlow, Keras or Torch	Robotics
023O	SeeByte	Image Processing Engineer – Machine Learning Engineer / Senior Engineer	Keen interest in Machine Learning, Computer Vision and Image Processing	Robotics

With the support of the Erasmus+ Programme of the European Union

No	Company name	Position	Requirements - Skills	Keyword
023O	SeeByte	Image Processing Engineer – Machine Learning Engineer / Senior Engineer	Cross-Cultural Sensitivity	Robotics
023O	SeeByte	Image Processing Engineer – Machine Learning Engineer / Senior Engineer	Strong interpersonal skills and the ability to work with external partners and clients	Robotics
023O	SeeByte	Image Processing Engineer – Machine Learning Engineer / Senior Engineer	Willingness to travel abroad to support client demonstrations and trials	Robotics
023O	SeeByte	Image Processing Engineer – Machine Learning Engineer / Senior Engineer	Enthused to learn new technology	Robotics
023O	SeeByte	Image Processing Engineer – Machine Learning Engineer / Senior Engineer	Autonomy / A.I.	Robotics
023O	SeeByte	Image Processing Engineer – Machine Learning Engineer / Senior Engineer	Knowledge of data mining/machine learning /deep learning algorithms	Robotics
023O	SeeByte	Image Processing Engineer – Machine Learning Engineer / Senior Engineer	Software verification and deployment	Robotics
023O	SeeByte	Image Processing Engineer – Machine Learning Engineer / Senior Engineer	Management and processing of Big Data	Robotics
023O	SeeByte	Image Processing Engineer – Machine Learning Engineer / Senior Engineer	Creation/Management of static and dynamic libraries	Robotics
023O	SeeByte	Image Processing Engineer – Machine Learning Engineer / Senior Engineer	Knowledge of Boost, OpenCV and Web Services	Robotics

With the support of the Erasmus+ Programme of the European Union

No	Company name	Position	Requirements - Skills	Keyword
024O	Raytheon Technologies	Autonomous Systems Developer	Strong programming skills and experience with C++, Java, and Python	Robotics
024O	Raytheon Technologies	Autonomous Systems Developer	Experience with autonomous robotics platforms (drones, UGVs), sensors and actuators	Robotics
024O	Raytheon Technologies	Autonomous Systems Developer	Position may require some amount of overnight travel.	Robotics
024O	Raytheon Technologies	Autonomous Systems Developer	U.S. person or the ability to obtain an Export Authorization from the appropriate government agency for non-U.S. persons	Robotics
024O	Raytheon Technologies	Autonomous Systems Developer	Experience with machine learning frameworks and analytic tools such as Tensorflow, Torch, PyTorch, etc.	Robotics
024O	Raytheon Technologies	Autonomous Systems Developer	Experience with computer vision, lidar, point clouds, and/or photogrammetry techniques.	Robotics
024O	Raytheon Technologies	Autonomous Systems Developer	Experience with human-machine interfaces	Robotics
024O	Raytheon Technologies	Autonomous Systems Developer	Passion for software engineering practices	Robotics
024O	Raytheon Technologies	Autonomous Systems Developer	Creative problem solving and ability to build rapid prototypes	Robotics
024O	Raytheon Technologies	Autonomous Systems Developer	Excellent communication skills	Robotics
025O	European Space Agency - ESA Lokalizacja firmy	Systems Engineer	General background and specific experience in the technical domains covered by the position	Robotics
025O	European Space Agency - ESA Lokalizacja firmy	Systems Engineer	Systems engineering experience in ADR and IOS mission studies and relevant technologies	Robotics
025O	European Space Agency - ESA Lokalizacja firmy	Systems Engineer	Knowledge of ESA and industrial development, verification and procurement processes	Robotics

With the support of the Erasmus+ Programme of the European Union

No	Company name	Position	Requirements - Skills	Keyword
025O	European Space Agency - ESA Lokalizacja firmy	Systems Engineer	Management of industrial activities including reviews	Robotics
025O	European Space Agency - ESA Lokalizacja firmy	Systems Engineer	Experience with Space Engineering Standards and their preparation and implementation	Robotics
025O	European Space Agency - ESA Lokalizacja firmy	Systems Engineer	Experience in co-engineering	Robotics
025O	European Space Agency - ESA Lokalizacja firmy	Systems Engineer	Experience with debris removal studies and technology development	Robotics
025O	European Space Agency - ESA Lokalizacja firmy	Systems Engineer	Knowledge of the main tools usable for model-based systems engineering	Robotics
025O	European Space Agency - ESA Lokalizacja firmy	Systems Engineer	Teamwork	Robotics
025O	European Space Agency - ESA Lokalizacja firmy	Systems Engineer	Communication	Robotics
025O	European Space Agency - ESA Lokalizacja firmy	Systems Engineer	Customer Focus	Robotics
025O	European Space Agency - ESA Lokalizacja firmy	Systems Engineer	Innovation & Creativity	Robotics
025O	European Space Agency - ESA Lokalizacja firmy	Systems Engineer	Results Orientation	Robotics

With the support of the Erasmus+ Programme of the European Union

No	Company name	Position	Requirements - Skills	Keyword
025O	European Space Agency - ESA Lokalizacja firmy	Systems Engineer	Planning & Organisation	Robotics
026O	Thales	Laser Service Engineer (ELI-NP)	Experience\knowledge in working with lasers;	Robotics
026O	Thales	Laser Service Engineer (ELI-NP)	Preferable having experience in aligning and testing opto-electronic or laser equipment;	Robotics
026O	Thales	Laser Service Engineer (ELI-NP)	Represents a plus if you have experience with any of:	Robotics
026O	Thales	Laser Service Engineer (ELI-NP)	Laser development;	Robotics
026O	Thales	Laser Service Engineer (ELI-NP)	Servicing lasers;	Robotics
026O	Thales	Laser Service Engineer (ELI-NP)	Strong innovation, analytical and diagnostic skills.	Robotics
026O	Thales	Laser Service Engineer (ELI-NP)	Assuring technical support;	Robotics
026O	Thales	Laser Service Engineer (ELI-NP)	Core competencies in electrical and mechanical systems incorporating electronics (mechatronics);	Robotics
026O	Thales	Laser Service Engineer (ELI-NP)	Troubleshooting electronic equipment;	Robotics
026O	Thales	Laser Service Engineer (ELI-NP)	Knowledge of CREOVIEW and ANSYS;	Robotics
026O	Thales	Laser Service Engineer (ELI-NP)	Master the CODE V software for optical systems.	Robotics
026O	Thales	Laser Service Engineer (ELI-NP)	Very good intellectual capabilities;	Robotics
026O	Thales	Laser Service Engineer (ELI-NP)	Technical troubleshooting ability;	Robotics

With the support of the Erasmus+ Programme of the European Union

No	Company name	Position	Requirements - Skills	Keyword
026O	Thales	Laser Service Engineer (ELI-NP)	Technical skills;	Robotics
026O	Thales	Laser Service Engineer (ELI-NP)	Solution oriented, team-working;	Robotics
026O	Thales	Laser Service Engineer (ELI-NP)	Excellent communication skills;	Robotics
026O	Thales	Laser Service Engineer (ELI-NP)	Motivation/Capability to travel and work in multi-cultural environment.	Robotics
027O	Stream	Software Engineer - C	Expertise writing maintainable and testable code in C#	Robotics
027O	Stream	Software Engineer - C	Some experience in WPF and / or Unity	Robotics
027O	Stream	Software Engineer - C	UI design / development experience	Robotics
027O	Stream	Software Engineer - C	Experience with C or Python	Robotics
027O	Stream	Software Engineer - C	Understanding of object orientated design patterns	Robotics
027O	Stream	Software Engineer - C	Experience of working with sensors (radar, vision, lidar etc)	Robotics
027O	Stream	Software Engineer - C	Algorithm development (e.g. AI, robotics, machine vision)	Robotics
027O	Stream	Software Engineer - C	Knowledge of Agile development practices, source control and continuous integration	Robotics
028O	N/D	Computer Vision Engineer	Degree educated within the field of AI, Computer Vision, Robotics or a comparable field	Robotics
028O	N/D	Computer Vision Engineer	Expertise in coding both Python and C++, with a proven track-record in SW Engineering	Robotics
028O	N/D	Computer Vision Engineer	Hands-on experience algorithm development within visual odometry and SLAM (DSO, VSO, ORBSLAM, or similar)	Robotics
028O	N/D	Computer Vision Engineer	Working knowledge of 3D geometries and optimization methods	Robotics
028O	N/D	Computer Vision Engineer	Working knowledge of 3D Pointcloud & Image processing (OpenCV, OpenGL, Open3d, ...)	Robotics
028O	N/D	Computer Vision Engineer	Fluency in English	Robotics
029O	MBDA	Guidance, Control and Navigation (GCN) Engineer	Relevant experience of applicable algorithms i.e. Guidance, Control, Data Fusion, Navigation, Image Processing.	Robotics
029O	MBDA	Guidance, Control and Navigation (GCN) Engineer	flight dynamics and aerodynamics	Robotics

With the support of the Erasmus+ Programme of the European Union

No	Company name	Position	Requirements - Skills	Keyword
029O	MBDA	Guidance, Control and Navigation (GCN) Engineer	sensors (e.g. IMUs, GPS, RF and IR seekers)	Robotics
029O	MBDA	Guidance, Control and Navigation (GCN) Engineer	actuation systems in relation to autopilot design and servo control.	Robotics
029O	MBDA	Guidance, Control and Navigation (GCN) Engineer	The MathWorks products – specifically Simulink, Embedded MATLAB and Stateflow	Robotics
029O	MBDA	Guidance, Control and Navigation (GCN) Engineer	C, FORTRAN and Ada	Robotics
029O	MBDA	Guidance, Control and Navigation (GCN) Engineer	be driven and be capable of working on your own initiative with a minimum of supervision, as well as within an algorithm development team working transversally with other functions	Robotics
029O	MBDA	Guidance, Control and Navigation (GCN) Engineer	have an understanding of and an ability to work within defined processes	Robotics
029O	MBDA	Guidance, Control and Navigation (GCN) Engineer	have the ability to visualise and analyse complex systems	Robotics
029O	MBDA	Guidance, Control and Navigation (GCN) Engineer	have good verbal, presentation and written communication skills	Robotics
029O	MBDA	Guidance, Control and Navigation (GCN) Engineer	have practical knowledge of basic systems engineering principles and processes	Robotics
029O	MBDA	Guidance, Control and Navigation (GCN) Engineer	be able to work with engineering teams, including in-house and contractor personnel	Robotics
029O	MBDA	Guidance, Control and Navigation (GCN) Engineer	have good understanding of, and good working experience in all phases of the engineering life cycle	Robotics
030O	MBDA	Intelligent Systems Engineer	Robotics, guidance and autonomous decision making,	Robotics
030O	MBDA	Intelligent Systems Engineer	Routing and motion/trajectory planning, optimisation, co-ordinated guidance and control, decision theory, MDPs/POMDPs, expert systems, game theory, decision support systems, multi-agent systems	Robotics
030O	MBDA	Intelligent Systems Engineer	Data fusion and state estimation/tracking algorithms e.g.	Robotics

With the support of the Erasmus+ Programme of the European Union

No	Company name	Position	Requirements - Skills	Keyword
030O	MBDA	Intelligent Systems Engineer	Kalman Filtering, multiple-model tracking methods, particle filters, grid-based estimation methods, Multi-Object-Multi-Sensor Fusion, data-association, random finite sets, Bayesian belief networks, Dempster-Shafer theory of evidence	Robotics
030O	MBDA	Intelligent Systems Engineer	Machine Learning for regression and pattern recognition/discovery problems e.g.	Robotics
030O	MBDA	Intelligent Systems Engineer	Gaussian processes, latent variable methods, support vector machines, probabilistic/statistical models, neural networks, Bayesian inference, random-forests, novelty detection, clustering	Robotics
030O	MBDA	Intelligent Systems Engineer	Deep Learning e.g.	Robotics
030O	MBDA	Intelligent Systems Engineer	Deep reinforcement learning, Monte-Carlo tree search, deep regression/classification, deep embeddings, recurrent Networks, natural language processing	Robotics
030O	MBDA	Intelligent Systems Engineer	Computer Vision algorithms e.g.	Robotics
030O	MBDA	Intelligent Systems Engineer	Structure from motion, image Based navigation, SLAM, pose estimation/recovery,	Robotics
030O	MBDA	Intelligent Systems Engineer	Matlab, Simulink and/or Stateflow	Robotics
030O	MBDA	Intelligent Systems Engineer	Python including PyTorch, TensorFlow, OpenAI-Gym/Universe	Robotics
030O	MBDA	Intelligent Systems Engineer	Model Based Design	Robotics
030O	MBDA	Intelligent Systems Engineer	have an understanding of and an ability to work within defined processes	Robotics
030O	MBDA	Intelligent Systems Engineer	have the ability to visualize and assess complex systems	Robotics
030O	MBDA	Intelligent Systems Engineer	have good verbal, presentation and written communication skills	Robotics
030O	MBDA	Intelligent Systems Engineer	have practical knowledge of basic systems engineering principles and processes	Robotics

With the support of the Erasmus+ Programme of the European Union

No	Company name	Position	Requirements - Skills	Keyword
030O	MBDA	Intelligent Systems Engineer	be able to work with engineering teams, including in-house and contractor personnel	Robotics
033O	SAAB	Head of Product Management, Underwater Systems	at least 5 years' experience of Product Management	Robotics
033O	SAAB	Head of Product Management, Underwater Systems	an B.Sc./M.Sc. (meritorious if for a technical education) or have relevant work experience	Robotics
033O	SAAB	Head of Product Management, Underwater Systems	proven leadership skills	Robotics
033O	SAAB	Head of Product Management, Underwater Systems	high levels of drive and engagement	Robotics
033O	SAAB	Head of Product Management, Underwater Systems	fluency in both Swedish and English.	Robotics
033O	SAAB	Head of Product Management, Underwater Systems	excellent influencing skills and interpersonal skills	Robotics
034O	Raytheon Technologies	AI Researcher/Scientist	Strong programming skills and experience with Java and/or C++	Robotics
034O	Raytheon Technologies	AI Researcher/Scientist	Experience with machine learning frameworks and analytic tools such as Tensorflow, Torch, PyTorch, etc. and experience with designing and prototyping, training, and evaluating machine learning methods	Robotics
034O	Raytheon Technologies	AI Researcher/Scientist	Passion for software engineering practices	Robotics
034O	Raytheon Technologies	AI Researcher/Scientist	Creative problem solving and ability to build rapid prototypes	Robotics

With the support of the Erasmus+ Programme of the European Union

No	Company name	Position	Requirements - Skills	Keyword
034O	Raytheon Technologies	AI Researcher/Scientist	Excellent communication skills	Robotics
034O	Raytheon Technologies	AI Researcher/Scientist	Experience with reinforcement learning techniques	Robotics
034O	Raytheon Technologies	AI Researcher/Scientist	Experience with symbolic or rule-based AI systems	Robotics
034O	Raytheon Technologies	AI Researcher/Scientist	Experience with autonomous robotics platforms (UAVs, UGVs), sensors and actuators	Robotics
034O	Raytheon Technologies	AI Researcher/Scientist	Experience with computer vision, lidar, point clouds, and/or photogrammetry techniques.	Robotics
034O	Raytheon Technologies	AI Researcher/Scientist	Experience with human-machine interfaces	Robotics
035O	Space Applications Services	Robotics Software Engineer - Sensor Fusion & Simulation (M/F)	MSc or PhD in relevant fields (e.g. robotics, computer science, computer vision, AI-ML or software engineering)	Robotics
035O	Space Applications Services	Robotics Software Engineer - Sensor Fusion & Simulation (M/F)	Strong theoretical and practical background in image processing, SLAM, state estimation and filtering	Robotics
035O	Space Applications Services	Robotics Software Engineer - Sensor Fusion & Simulation (M/F)	Very strong programming skills (C++, Python) on Linux environment	Robotics
035O	Space Applications Services	Robotics Software Engineer - Sensor Fusion & Simulation (M/F)	Thorough experience of SW development in ROS & ROS2 and simulation in Gazebo (additional robotics middleware or simulators is desirable)	Robotics
035O	Space Applications Services	Robotics Software Engineer - Sensor Fusion & Simulation (M/F)	Good proficiency with technical documentation	Robotics
035O	Space Applications Services	Robotics Software Engineer - Sensor Fusion & Simulation (M/F)	At least 1 year of research or industrial experience	Robotics

With the support of the Erasmus+ Programme of the European Union

No	Company name	Position	Requirements - Skills	Keyword
035O	Space Applications Services	Robotics Software Engineer - Sensor Fusion & Simulation (M/F)	Image processing: Feature extraction, 3D point clouds registration, model detection, matching and tracking using analytical or AI-ML techniques	Robotics
035O	Space Applications Services	Robotics Software Engineer - Sensor Fusion & Simulation (M/F)	OpenCV, PCL, ViSP, TensorFlow, Qt, Gazebo, Web technologies and AWS	Robotics
035O	Space Applications Services	Robotics Software Engineer - Sensor Fusion & Simulation (M/F)	Mobile robotics-modelling, localisation, mapping, motion control, path planning	Robotics
035O	Space Applications Services	Robotics Software Engineer - Sensor Fusion & Simulation (M/F)	Robotics software architectures (design), Robotics Middleware and Networking	Robotics
035O	Space Applications Services	Robotics Software Engineer - Sensor Fusion & Simulation (M/F)	Experience in Real-time operating systems and embedded systems	Robotics
035O	Space Applications Services	Robotics Software Engineer - Sensor Fusion & Simulation (M/F)	Gitlab and Continuous Integration methodologies.	Robotics
036O	SeeByte	Software Engineers / Senior Software Engineers	Graduated with a BSc or an MSc in Software Engineering or a similar numerical degree (2:1 or above)	Robotics
036O	SeeByte	Software Engineers / Senior Software Engineers	Proficient in one of the following languages: C++ (Ubuntu/windows), C#/java for windows UI development. Knowledge of more than one programming language is advantageous.	Robotics
036O	SeeByte	Software Engineers / Senior Software Engineers	Strong numerical and mathematical skills	Robotics
036O	SeeByte	Software Engineers / Senior Software Engineers	Strong interpersonal skills and the ability to work with external partners and clients	Robotics
036O	SeeByte	Software Engineers / Senior Software Engineers	The ability to mentor and supervise engineers and technical development in the company	Robotics

With the support of the Erasmus+ Programme of the European Union

No	Company name	Position	Requirements - Skills	Keyword
036O	SeeByte	Software Engineers / Senior Software Engineers	Willingness to travel abroad to support on-site client demonstrations and training	Robotics
036O	SeeByte	Software Engineers / Senior Software Engineers	Enthused to learn new technology	Robotics
036O	SeeByte	Software Engineers / Senior Software Engineers	Autonomy / A.I.	Robotics
036O	SeeByte	Software Engineers / Senior Software Engineers	Knowledge of data mining/machine learning /deep learning algorithms	Robotics
036O	SeeByte	Software Engineers / Senior Software Engineers	Software verification and deployment	Robotics
036O	SeeByte	Software Engineers / Senior Software Engineers	Management and processing of Big Data	Robotics
036O	SeeByte	Software Engineers / Senior Software Engineers	Creation/Management of static and dynamic libraries	Robotics
036O	SeeByte	Software Engineers / Senior Software Engineers	Knowledge of Boost, OpenCV and Web Services	Robotics
036O	SeeByte	Software Engineers / Senior Software Engineers	Familiarity with ROS, Docker container	Robotics
036O	SeeByte	Software Engineers / Senior Software Engineers	Knowledge of service oriented architecture	Robotics
036O	SeeByte	Software Engineers / Senior Software Engineers	3 years of experience required for the Senior Role	Robotics
037O	Thales	System Test Engineer	Bachelor/Master of Science in e.g. Electrical Engineering, Electronics, Computer science, Applied Physics, Mechatronics	Robotics
037O	Thales	System Test Engineer	Affinity with radar, affinity with analogue technologies, the Linux terminal or computer networks are an advantage	Robotics
037O	Thales	System Test Engineer	Professional language skills in English (verbal and writing), other language skills are an advantage.	Robotics
037O	Thales	System Test Engineer	Analytical and problem-solving capacity	Robotics
037O	Thales	System Test Engineer	Ability to empathize with other cultures and customs	Robotics

With the support of the Erasmus+ Programme of the European Union

No	Company name	Position	Requirements - Skills	Keyword
038O	Sapienza Consulting Lokalizacja firmy	Knowledge Management & Data Protection (ESA-ESTEC)	Applicants should have a Master's degree (or equivalent) from a recognised Institution in disciplines such as business and administration management, project management, business engineering and process development. An additional Master in a Science field is considered an asset	Robotics
038O	Sapienza Consulting Lokalizacja firmy	Knowledge Management & Data Protection (ESA-ESTEC)	Minimum 4 years of relevant work experience, e.g. areas of KM, LL an PDP	Robotics
038O	Sapienza Consulting Lokalizacja firmy	Knowledge Management & Data Protection (ESA-ESTEC)	In depth knowledge of relevant technical and legal domains	Robotics
038O	Sapienza Consulting Lokalizacja firmy	Knowledge Management & Data Protection (ESA-ESTEC)	Technical understanding of PDP/GDPR concepts	Robotics
038O	Sapienza Consulting Lokalizacja firmy	Knowledge Management & Data Protection (ESA-ESTEC)	Knowledge of ESA and its programmes/projects is an asset	Robotics
038O	Sapienza Consulting Lokalizacja firmy	Knowledge Management & Data Protection (ESA-ESTEC)	Fluent in English; knowledge of another ESA member-state language is an asset	Robotics
038O	Sapienza Consulting Lokalizacja firmy	Knowledge Management & Data Protection (ESA-ESTEC)	Candidates must be eligible to work in the EU	Robotics
039O	ESA	Systems Engineer	General background and specific experience in the technical domains covered by the positionSystems engineering experience in ADR and IOS mission studies and relevant technologies	Robotics
039O	ESA	Systems Engineer	Knowledge of ESA and industrial development, verification and procurement processes	Robotics
039O	ESA	Systems Engineer	Management of industrial activities including reviews	Robotics
039O	ESA	Systems Engineer	Experience with Space Engineering Standards and their preparation and implementationExperience in co-engineering	Robotics
039O	ESA	Systems Engineer	Experience with debris removal studies and technology development	Robotics

With the support of the Erasmus+ Programme of the European Union

No	Company name	Position	Requirements - Skills	Keyword
039O	ESA	Systems Engineer	Knowledge of the main tools usable for model-based systems engineering	Robotics
039O	ESA	Systems Engineer	Substantial experience in the fields of System Engineering, Orbital Robotics, and GNC;	Robotics
039O	ESA	Systems Engineer	5+ years' experience in system engineering in ADR and In-Orbit Servicing mission studies and relevant technology developments;	Robotics
039O	ESA	Systems Engineer	A creative approach and an ability to push outside the boundaries;	Robotics
039O	ESA	Systems Engineer	Knowledge of European capabilities in the areas of Active Debris Removal and On-Orbit Servicing;	Robotics
039O	ESA	Systems Engineer	A solid background in systems engineering, concurrent engineering processes and MBSE tools;	Robotics
039O	ESA	Systems Engineer	An understanding of Sustainable Close Proximity Operations;	Robotics
039O	ESA	Systems Engineer	Knowledge of other areas within the Clean Space Office is considered an asset (Eco-Design process, Space Debris Mitigation and Design for Removal technologies);	Robotics
039O	ESA	Systems Engineer	Knowledge of relevant activities across the different ESA programmes is considered an asset.	Robotics
039O	ESA	Systems Engineer	Teamwork	Robotics
039O	ESA	Systems Engineer	Communication	Robotics
039O	ESA	Systems Engineer	Customer	Robotics
039O	ESA	Systems Engineer	Focus	Robotics
039O	ESA	Systems Engineer	Innovation	Robotics
039O	ESA	Systems Engineer	Creativity	Robotics
039O	ESA	Systems Engineer	Results Orientation	Robotics
039O	ESA	Systems Engineer	Planning	Robotics
039O	ESA	Systems Engineer	Organisation	Robotics
040O	Cirrus Selection	Intelligent Autonomous Systems Engineer	Preferably PhD qualified in related area	Robotics
040O	Cirrus Selection	Intelligent Autonomous Systems Engineer	A good level degree with strong mathematical content and programming skills e.g. Engineering, Mathematics, Physics, Computer Science, Information Engineering.	Robotics

With the support of the Erasmus+ Programme of the European Union

No	Company name	Position	Requirements - Skills	Keyword
040O	Cirrus Selection	Intelligent Autonomous Systems Engineer	A keen interest in cutting-edge technologies.	Robotics
040O	Cirrus Selection	Intelligent Autonomous Systems Engineer	Relevant experience, Post-Doctoral or Industrial; in robotics, autonomous decision making, data fusion, tracking/estimation, pattern discovery & recognition, statistical inference, optimisation and machine/deep learning algorithms, Real-time implementation and/or validation & verification is a strong advantage.	Robotics
040O	Cirrus Selection	Intelligent Autonomous Systems Engineer	Applications from candidates who are in the process of completing their PhD are also welcome.	Robotics
042O	Space Applications Services	Chemical Propulsion Engineer (M/F)	A good knowledge of other specialist technological areas involved in space propulsion i.e. materials, thermal, mechanical would be an advantage.	Robotics
042O	Space Applications Services	Chemical Propulsion Engineer (M/F)	A proactive approach, with initiative and ability to work independently	Robotics
042O	Space Applications Services	Chemical Propulsion Engineer (M/F)	Good interpersonal skills and team spirit	Robotics
042O	Space Applications Services	Chemical Propulsion Engineer (M/F)	Synthesise, summarise and draw conclusions	Robotics
042O	Space Applications Services	Chemical Propulsion Engineer (M/F)	Adhere to strict standards of confidentiality	Robotics
042O	Space Applications Services	Chemical Propulsion Engineer (M/F)	Work in distributed international teams	Robotics
042O	Space Applications Services	Chemical Propulsion Engineer (M/F)	Strength to cope with schedules and deadlines	Robotics
042O	Space Applications Services	Chemical Propulsion Engineer (M/F)	Excellent organisational and communication skills	Robotics
043O	Rheinmetall Protection Systems	Engineer Test and Trial	Successfully passed studies in the field of electrical engineering, electronics, mechatronics or physics	Robotics
043O	Rheinmetall Protection Systems	Engineer Test and Trial	Several years of professional experience and profound knowledge in the field of testing and commissioning	Robotics
043O	Rheinmetall Protection Systems	Engineer Test and Trial	Several years of experience in functional testing of complex electronic control systems (real-time)	Robotics

With the support of the Erasmus+ Programme of the European Union

No	Company name	Position	Requirements - Skills	Keyword
043O	Rheinmetall Protection Systems	Engineer Test and Trial	Experience in the field of planning and implementation of environmental qualification tests	Robotics
043O	Rheinmetall Protection Systems	Engineer Test and Trial	Knowledge in the field of planning EMV tests	Robotics
043O	Rheinmetall Protection Systems	Engineer Test and Trial	Very good German and English language skills in speaking and writing	Robotics
043O	Rheinmetall Protection Systems	Engineer Test and Trial	Knowledge of MS Office, MS Project, DOORS, database SW, Matlab	Robotics
043O	Rheinmetall Protection Systems	Engineer Test and Trial	High ability to think abstractly, good analytical skills and a high degree of initiative and flexibility	Robotics
043O	Rheinmetall Protection Systems	Engineer Test and Trial	Team spirit and assertiveness	Robotics
044O	Smiths Interconnect	Electronic Engineer	Candidates must be energetic, professional, proactive and be a team player that can take ownership of their tasks and demonstrate a desire to resolve problems	Robotics
044O	Smiths Interconnect	Electronic Engineer	10 years' experience in electronic industry or in opto-electronics preferred	Robotics
044O	Smiths Interconnect	Electronic Engineer	Bachelor's degree in Engineering, BS in Electrical Engineering preferred	Robotics
044O	Smiths Interconnect	Electronic Engineer	Candidates must have experience interacting with customers	Robotics
044O	Smiths Interconnect	Electronic Engineer	Candidates must be available to travel domestically and internationally as needed	Robotics
044O	Smiths Interconnect	Electronic Engineer	Candidates must be able to define formal requirements	Robotics
044O	Smiths Interconnect	Electronic Engineer	Candidates must know how to use a Product Life Cycle Management Software	Robotics
044O	Smiths Interconnect	Electronic Engineer	Communicate perfectly in English & adequately in French (spoken and written)	Robotics
044O	Smiths Interconnect	Electronic Engineer	Comfortable in a very fast-paced environment with high degrees of autonomy	Robotics
045O	Rheinmetall Protection Systems	Development Engineer for the Systems Engineering division	Completed studies in the field of electrical engineering, electronics, mechatronics or systems engineering	Robotics
045O	Rheinmetall Protection Systems	Development Engineer for the Systems Engineering division	Several years of professional experience and sound knowledge in the planning, implementation and commissioning of complex electrical/electronic systems	Robotics

With the support of the Erasmus+ Programme of the European Union

No	Company name	Position	Requirements - Skills	Keyword
045O	Rheinmetall Protection Systems	Development Engineer for the Systems Engineering division	Experience in the configuration of complex electrical/electronic systems with distributed intelligence	Robotics
045O	Rheinmetall Protection Systems	Development Engineer for the Systems Engineering division	Knowledge in the creation of requirements specifications and with requirements management tools (e.g. DOORS)	Robotics
045O	Rheinmetall Protection Systems	Development Engineer for the Systems Engineering division	Experience in the preparation of MTBF, FTA and FMEA analyses and in the use of corresponding software tools	Robotics
045O	Rheinmetall Protection Systems	Development Engineer for the Systems Engineering division	Knowledge in the field of functional safety (EN 61508)	Robotics
045O	Rheinmetall Protection Systems	Development Engineer for the Systems Engineering division	Experience in the creation of functional descriptions/modelling (e.g. with SYSML, UML)	Robotics
045O	Rheinmetall Protection Systems	Development Engineer for the Systems Engineering division	Business fluent in German and English	Robotics
046O	N/D	Assistant Configuration Officer	Bachelor Degree in a relevant discipline;	Robotics
046O	N/D	Assistant Configuration Officer	Good organisation skill, customer oriented behaviour and rigorous work approach;	Robotics
046O	N/D	Assistant Configuration Officer	Previous experience in the processing of technical documentation;	Robotics
046O	N/D	Assistant Configuration Officer	Fluency in English is mandatory; knowledge of another European language is anadvantage.	Robotics
047O	ANALOG DEVICES	Director, Connected Motion and Robotics	Degree in Business or Engineering related discipline.	Robotics
047O	ANALOG DEVICES	Director, Connected Motion and Robotics	Masters, PhD or MBA level an advantage	Robotics

With the support of the Erasmus+ Programme of the European Union

No	Company name	Position	Requirements - Skills	Keyword
047O	ANALOG DEVICES	Director, Connected Motion and Robotics	Minimum of 5 years' experience in marketing or business strategy role	Robotics
047O	ANALOG DEVICES	Director, Connected Motion and Robotics	Significant travel to worldwide customers and ADI sites	Robotics
048O	N/D	Core Software Engineer - Java & work with Python/NodeJS	Strong Java knowledge	Robotics
048O	N/D	Core Software Engineer - Java & work with Python/NodeJS	Knowledge of or a desire to work with Python / NodeJS	Robotics
048O	N/D	Core Software Engineer - Java & work with Python/NodeJS	Bachelors Degree in a related field.	Robotics
048O	N/D	Core Software Engineer - Java & work with Python/NodeJS	Proven experience in working with parallel and distributed computing framework such as Hadoop, Spark, Cassandra, Akka, Storm, RabbitMQ, Giraph, Kafka, Zookeeper, etc.	Robotics
048O	N/D	Core Software Engineer - Java & work with Python/NodeJS	Proven experience in build and release (CI/CD) engineering	Robotics
048O	N/D	Core Software Engineer - Java & work with Python/NodeJS	Proven experience in working with database systems	Robotics
049O	Leonardo	Senior Systems Engineer – Autonomy, Algorithms, Design, MATLAB	Experience working with tasking of multiple RF / EO / IR sensor systems.	Autonomous Systems Engineer
049O	Leonardo	Senior Systems Engineer – Autonomy, Algorithms, Design, MATLAB	Background in modelling control systems and environments.	Autonomous Systems Engineer

With the support of the Erasmus+ Programme of the European Union

No	Company name	Position	Requirements - Skills	Keyword
049O	Leonardo	Senior Systems Engineer – Autonomy, Algorithms, Design, MATLAB	Proficiency in the use of mathematical modelling tools such as MATLAB and Simulink. Experience of embedded code generation and/or HDL code generation from Mathworks products is desirable.	Autonomous Systems Engineer
049O	Leonardo	Senior Systems Engineer – Autonomy, Algorithms, Design, MATLAB	Knowledge of Radar, EO/IR and/or EW technology, performance, operational capabilities, and use.	Autonomous Systems Engineer
049O	Leonardo	Senior Systems Engineer – Autonomy, Algorithms, Design, MATLAB	Experience working with configuration management tools such as Team Foundation Server and/or Git.	Autonomous Systems Engineer
053O	Thales	System Engineer	Proven experience in developing small and medium systems with software components, comprising processing, simulations, cybersecurity, timing accuracy, communication units and HMI (2-3 years)	Autonomous Systems Engineer
053O	Thales	System Engineer	Proven experience in DOORS, familiarity with model based engineering an advantage	Autonomous Systems Engineer
053O	Thales	System Engineer	Experience in security driven software systems	Autonomous Systems Engineer
053O	Thales	System Engineer	Experience of network and network protocols, TCP/IP, RHEL Linux (1-3 years), focus on security is an advantage	Autonomous Systems Engineer
053O	Thales	System Engineer	Process-oriented and self-sustained working style (e.g.Agile principles), value pulled engineering is an advantage	Autonomous Systems Engineer
053O	Thales	System Engineer	General knowledge of Ground and Space SW concepts, ECSS or GSWS-G would be beneficial	Autonomous Systems Engineer
053O	Thales	System Engineer	Ability to work within a team with a high degree of design complexity and significant levels of uncertainty.	
054O	Raytheon Technologies	Senior Systems Engineer	Strong programming skills, particularly in Java, C/C++, Python	Autonomous Systems Engineer
054O	Raytheon Technologies	Senior Systems Engineer	Experience with distributed systems, cybersecurity, middleware	Autonomous Systems Engineer
054O	Raytheon Technologies	Senior Systems Engineer	Creative problem solving and experimental design	Autonomous Systems Engineer
054O	Raytheon Technologies	Senior Systems Engineer	Good oral and written communication skills	Autonomous Systems Engineer

With the support of the Erasmus+ Programme of the European Union

No	Company name	Position	Requirements - Skills	Keyword
054O	Raytheon Technologies	Senior Systems Engineer	Analytic thinking and problem solving	Autonomous Systems Engineer
054O	Raytheon Technologies	Senior Systems Engineer	Long term view, ability to capture and communicate complex ideas	Autonomous Systems Engineer
056O	QinetiQ	Principal Systems Engineer - Data & Information Systems	Proven application of Systems Engineering approach through technical delivery lifecycle	Autonomous Systems Engineer
056O	QinetiQ	Principal Systems Engineer - Data & Information Systems	Knowledge of multi-level security and protective monitoring	Autonomous Systems Engineer
056O	QinetiQ	Principal Systems Engineer - Data & Information Systems	Experience with Virtualisation, Microsoft Server, routing and firewalls	Autonomous Systems Engineer
056O	QinetiQ	Principal Systems Engineer - Data & Information Systems	Information, data and message flows; interfaces and analytics	Autonomous Systems Engineer
056O	QinetiQ	Principal Systems Engineer - Data & Information Systems	Secure network components, system design and configuration	Autonomous Systems Engineer
056O	QinetiQ	Principal Systems Engineer - Data & Information Systems	Solution design and development; analytical, logical and systems thinking skills	Autonomous Systems Engineer
056O	QinetiQ	Principal Systems Engineer - Data & Information Systems	Planning for integration, test, certification, trials and acceptance	Autonomous Systems Engineer
056O	QinetiQ	Principal Systems Engineer - Data & Information Systems	SC Clearance to apply and willing to obtain higher clearances	Autonomous Systems Engineer
057O	INTRACOM DEFENSE	Senior Power Systems Hardware Design Engineer	Familiarity with power systems modelling & simulation (MATLAB, SIMULINK, P-SPICE)	Autonomous Systems Engineer

With the support of the Erasmus+ Programme of the European Union

No	Company name	Position	Requirements - Skills	Keyword
057O	INTRACOM DEFENSE	Senior Power Systems Hardware Design Engineer	Familiarity with microgrids, grid interconnection, autonomous systems	Autonomous Systems Engineer
057O	INTRACOM DEFENSE	Senior Power Systems Hardware Design Engineer	Knowledge of diesel engines & OBD communication protocols	Autonomous Systems Engineer
057O	INTRACOM DEFENSE	Senior Power Systems Hardware Design Engineer	Strong analytical and problem solving skills	Autonomous Systems Engineer
057O	INTRACOM DEFENSE	Senior Power Systems Hardware Design Engineer	Strong verbal and written communication skills, both in English and Greek	Autonomous Systems Engineer
057O	INTRACOM DEFENSE	Senior Power Systems Hardware Design Engineer	Willingness to take initiative and motivation to drive results	Autonomous Systems Engineer
057O	INTRACOM DEFENSE	Senior Power Systems Hardware Design Engineer	Very good planning and time-management skills	Autonomous Systems Engineer
057O	INTRACOM DEFENSE	Senior Power Systems Hardware Design Engineer	High sense of accountability and great ability to work effectively both independently and within a team	Autonomous Systems Engineer
060O	Science [&] Technology	Software Engineer	Excellent command of C and Python and associated tooling and frameworks (compilers, bindings, unit testing, version control, etc.); experience in MATLAB and/or C++ is a big plus;	Autonomous Systems Engineer
060O	Science [&] Technology	Software Engineer	Good understanding of electronics, in particular of working principles of sensors and AD/DA conversion;	Autonomous Systems Engineer
060O	Science [&] Technology	Software Engineer	Good understanding of basic control theory, signal processing and state estimation;	Autonomous Systems Engineer
060O	Science [&] Technology	Software Engineer	Practical experience with serial interfaces, such as CAN, SPI, I2C, etc.;	Autonomous Systems Engineer
060O	Science [&] Technology	Software Engineer	Experience with ARM platforms and toolchains or other embedded processors;	Autonomous Systems Engineer
060O	Science [&] Technology	Software Engineer	Experience with FPGA is a plus;	Autonomous Systems Engineer
060O	Science [&] Technology	Software Engineer	You are fluent in written and spoken Dutch and English;	Autonomous Systems Engineer

With the support of the Erasmus+ Programme of the European Union

No	Company name	Position	Requirements - Skills	Keyword
060O	Science [&] Technology	Software Engineer	Experience with version management systems / source control (Github, SVN) build environment (Jenkins), tooling like Redmine, JIRA.	Autonomous Systems Engineer
060O	Science [&] Technology	Software Engineer	You have a strong analytical mind that enjoys coming up with novel solutions;	Autonomous Systems Engineer
060O	Science [&] Technology	Software Engineer	You are capable of self-study and quickly acquiring new knowledge/new skills across technical areas;	Autonomous Systems Engineer
060O	Science [&] Technology	Software Engineer	Able to work in multi-disciplinary teams, where you might be the only software engineer;	Autonomous Systems Engineer
060O	Science [&] Technology	Software Engineer	Autonomous and proactive;	Autonomous Systems Engineer
060O	Science [&] Technology	Software Engineer	Good communication and documentation skills in English.	Autonomous Systems Engineer
060O	Science [&] Technology	Software Engineer	You function well in a team (2-5 people) and are able to communicate effectively and clearly (both verbally and in writing) with customers and your team members;	Autonomous Systems Engineer
061O	INTRACOM DEFENSE	Power Systems Hardware Design Engineer	Familiarity with power systems modelling & simulation (MATLAB, SIMULINK, P-SPICE)	Autonomous Systems Engineer
061O	INTRACOM DEFENSE	Power Systems Hardware Design Engineer	Familiarity with microgrids, grid interconnection, autonomous systems	Autonomous Systems Engineer
061O	INTRACOM DEFENSE	Power Systems Hardware Design Engineer	Knowledge of diesel engines & OBD communication protocols	Autonomous Systems Engineer
061O	INTRACOM DEFENSE	Power Systems Hardware Design Engineer		Autonomous Systems Engineer
061O	INTRACOM DEFENSE	Power Systems Hardware Design Engineer		Autonomous Systems Engineer
062O	Bethan McAulay	Guidance, Navigation and Control Engineer	Familiarity with classical as well as modern control and filtering techniques	Autonomous Systems Engineer
062O	Bethan McAulay	Guidance, Navigation and Control Engineer	Proven experience in the design, tuning, analysis and simulation of GNC systems in different project phases, and including Thrust Vector Control/Attitude Control Systems	Autonomous Systems Engineer

With the support of the Erasmus+ Programme of the European Union

No	Company name	Position	Requirements - Skills	Keyword
062O	Bethan McAulay	Guidance, Navigation and Control Engineer	Proven knowledge of modern control design methods, commercial model-based design tools (MATLAB).	Autonomous Systems Engineer
062O	Bethan McAulay	Guidance, Navigation and Control Engineer	Experience with rapid-prototyping of hardware-in-the-loop systems.	Autonomous Systems Engineer
062O	Bethan McAulay	Guidance, Navigation and Control Engineer	Strong analytical and problem solving skills	Autonomous Systems Engineer
062O	Bethan McAulay	Guidance, Navigation and Control Engineer	Strong verbal and written communication skills, both in English and Greek	Autonomous Systems Engineer
062O	Bethan McAulay	Guidance, Navigation and Control Engineer	Willingness to take initiative and motivation to drive results	Autonomous Systems Engineer
062O	Bethan McAulay	Guidance, Navigation and Control Engineer	Very good planning and time-management skills	Autonomous Systems Engineer
062O	Bethan McAulay	Guidance, Navigation and Control Engineer	High sense of accountability and great ability to work effectively both independently and within a team	Autonomous Systems Engineer
062O	Bethan McAulay	Guidance, Navigation and Control Engineer	Ability to interface with industry	Autonomous Systems Engineer
062O	Bethan McAulay	Guidance, Navigation and Control Engineer	Ability to work both autonomously and as part of a team	Autonomous Systems Engineer
062O	Bethan McAulay	Guidance, Navigation and Control Engineer	Good English language skills	Autonomous Systems Engineer
062O	Bethan McAulay	Guidance, Navigation and Control Engineer	Excellent analytical skills	Autonomous Systems Engineer
062O	Bethan McAulay	Guidance, Navigation and Control Engineer	Proactive attitude to problem solving	Autonomous Systems Engineer
064O	HELLSICHT GmbH	Computer Vision Engineer	Hands-on experience with algorithms in the domain of visual odometry and SLAM (DSO, VSO, ORBSLAM, etc.)	Autonomous Systems Engineer
064O	HELLSICHT GmbH	Computer Vision Engineer	Experience in building, visualizing and interacting with 3D geometries	Autonomous Systems Engineer
064O	HELLSICHT GmbH	Computer Vision Engineer	Deep understanding of optimization methods and classical computer vision techniques	Autonomous Systems Engineer
064O	HELLSICHT GmbH	Computer Vision Engineer	Basic understanding of Deep Learning and Machine Learning techniques	Autonomous Systems Engineer

With the support of the Erasmus+ Programme of the European Union

No	Company name	Position	Requirements - Skills	Keyword
064O	HELLSICHT GmbH	Computer Vision Engineer	Solid software engineering skills and committment to writing clean and well structured code	Autonomous Systems Engineer
064O	HELLSICHT GmbH	Computer Vision Engineer	High proficiency in C++ and Python	Autonomous Systems Engineer
065O	Thales	Senior Embedded Software Engineer	Solid and proven experience in embedded software development on Linux platform, in C/C++ (Linux configuration, board support packages, boot loaders, kernel, drivers and application development…);	Autonomous Systems Engineer
065O	Thales	Senior Embedded Software Engineer	Experience with concurrent, multi-threaded programming, and ideally distributed systems as well;	Autonomous Systems Engineer
065O	Thales	Senior Embedded Software Engineer	You know software engineering fundamentals and best practices (Agile, OO, SOLID principles, design patterns, unit testing/mocks…) and apply them;	Autonomous Systems Engineer
065O	Thales	Senior Embedded Software Engineer	Knowledge of embedded software tools used by Thales (Yocto, Meson, Clang, GCC, QEMU, SONARQUBE, Git, Bitbucket, Jenkins…);	Autonomous Systems Engineer
065O	Thales	Senior Embedded Software Engineer	Not mandatory knowledge, but a definite plus :	Autonomous Systems Engineer
065O	Thales	Senior Embedded Software Engineer		Autonomous Systems Engineer
065O	Thales	Senior Embedded Software Engineer	UML and MBSE;	Autonomous Systems Engineer
065O	Thales	Senior Embedded Software Engineer	Network protocols (IP v4/v6, TCP/UDP, DHCP, NTP, ICMP, IPSec, 802.1 family…);	Autonomous Systems Engineer
065O	Thales	Senior Embedded Software Engineer	FreeRTOS;	Autonomous Systems Engineer
065O	Thales	Senior Embedded Software Engineer	Security (TPM 2, secure boot, Linux hardening, secure by design…);	Autonomous Systems Engineer
065O	Thales	Senior Embedded Software Engineer	ARM platforms (STM32, i.MX);	Autonomous Systems Engineer
065O	Thales	Senior Embedded Software Engineer	Buses (I2C, SPI, PCIe…);	Autonomous Systems Engineer
065O	Thales	Senior Embedded Software Engineer	Audio/Video (codecs, processing, formats…);	Autonomous Systems Engineer

With the support of the Erasmus+ Programme of the European Union

No	Company name	Position	Requirements - Skills	Keyword
065O	Thales	Senior Embedded Software Engineer	SCRUM.	Autonomous Systems Engineer
065O	Thales	Senior Embedded Software Engineer	You are in line with our philosophy of maximizing reuse (open-source or commercial off-the-shelf components, design for reuse, standardize documents, tools…);	Autonomous Systems Engineer
065O	Thales	Senior Embedded Software Engineer	Proactive and autonomous, you like to take the initiative, and feel ready to lead a team and/or development;	Autonomous Systems Engineer
065O	Thales	Senior Embedded Software Engineer	Strong interest in software quality and excellence, yet pragmatic;	Autonomous Systems Engineer
065O	Thales	Senior Embedded Software Engineer	Curious, eager to learn and develop yourself, you like innovation and thinking outside the box;	Autonomous Systems Engineer
065O	Thales	Senior Embedded Software Engineer	Full professional proficiency in English. French and/or Dutch is a plus.	Autonomous Systems Engineer
066O	MBDA	Simulation and Modelling Engineer	Software configuration	Engineering for Autonomous Systems
066O	MBDA	Simulation and Modelling Engineer	A keen understanding of modelling processes	Engineering for Autonomous Systems
066O	MBDA	Simulation and Modelling Engineer	Working within a quality process	Engineering for Autonomous Systems
066O	MBDA	Simulation and Modelling Engineer	be highly autonomous and pro-active and be capable of working on your own initiative with a minimum of supervision, as well as within a Simulation and Modelling team working transversally with other functions	Engineering for Autonomous Systems
066O	MBDA	Simulation and Modelling Engineer	have an understanding of and an ability to work within defined processes	Engineering for Autonomous Systems
066O	MBDA	Simulation and Modelling Engineer	have the ability to visualize and analyse complex systems	Engineering for Autonomous Systems
066O	MBDA	Simulation and Modelling Engineer	have good verbal, presentation and written communication skills	Engineering for Autonomous Systems
066O	MBDA	Simulation and Modelling Engineer	have practical knowledge of basic systems engineering principles and processes	Engineering for Autonomous Systems

With the support of the Erasmus+ Programme of the European Union

No	Company name	Position	Requirements - Skills	Keyword
066O	MBDA	Simulation and Modelling Engineer	be able to work with engineering teams, including in-house and contractor personnel	Engineering for Autonomous Systems
066O	MBDA	Simulation and Modelling Engineer	have experience in applying systems engineering practices to large hardware/software development efforts, preferably in an Aerospace and/or Defence program environment	Engineering for Autonomous Systems
066O	MBDA	Simulation and Modelling Engineer	have good understanding of, and good working experience in all phases of the engineering life cycle	Engineering for Autonomous Systems
068O	MBDA	Navigation Algorithm Design	IIR and RF image and signal processing for target acquisition and tracking	Engineering for Autonomous Systems
068O	MBDA	Navigation Algorithm Design	Data fusion	Engineering for Autonomous Systems
068O	MBDA	Navigation Algorithm Design	Terminal and Homing Guidance	Engineering for Autonomous Systems
068O	MBDA	Navigation Algorithm Design	Mid-Course guidance	Engineering for Autonomous Systems
068O	MBDA	Navigation Algorithm Design	Autopilots and control systems	Engineering for Autonomous Systems
068O	MBDA	Navigation Algorithm Design	Propulsion control	Engineering for Autonomous Systems
068O	MBDA	Navigation Algorithm Design	Integrated Navigation, including GPS integration and Terrain Referenced Navigation	Engineering for Autonomous Systems
068O	MBDA	Navigation Algorithm Design	Command and Control	Engineering for Autonomous Systems
068O	MBDA	Navigation Algorithm Design	Mission Planning algorithms	Engineering for Autonomous Systems
070O	Thales	Hardware Solution Architect	High developed Engineering skills	Engineering for Autonomous Systems
070O	Thales	Hardware Solution Architect	Computer literate with extensive experience using development tools such as Engineering Development Tools (PCM, DOORS), a Configuration Management tool and Microsoft Office suite	Engineering for Autonomous Systems

With the support of the Erasmus+ Programme of the European Union

No	Company name	Position	Requirements - Skills	Keyword
070O	Thales	Hardware Solution Architect	Well-developed verbal skills to interact effectively and professionally in a variety of forums	Engineering for Autonomous Systems
070O	Thales	Hardware Solution Architect	Well-developed writing skills to prepare effective reports, documents, etc. in a clear and concise format	Engineering for Autonomous Systems
070O	Thales	Hardware Solution Architect	Very good English skills	Engineering for Autonomous Systems
070O	Thales	Hardware Solution Architect	Highly flexible team player, organized, motivated	Engineering for Autonomous Systems
071O	QinetiQ	Associate - Autonomous Systems (Live, Virtual, Constructive)	Broad understanding of computer and IT hardware and technologies, including networking, display devices and HMI devices / controllers.	Engineering for Autonomous Systems
071O	QinetiQ	Associate - Autonomous Systems (Live, Virtual, Constructive)	Experience working with simulation components that may include Computer Generated Forces, Image Generators and Virtual Environments.	Engineering for Autonomous Systems
071O	QinetiQ	Associate - Autonomous Systems (Live, Virtual, Constructive)	Awareness or experience with commonly used simulation protocols such as DIS, HLA or DDS.	Engineering for Autonomous Systems
071O	QinetiQ	Associate - Autonomous Systems (Live, Virtual, Constructive)	Good awareness of software engineering lifecycles, including a demonstrable understanding of different approaches to software development for products as well as research. Experience in a development environment using C/C++, Python or Java may also be an advantage.	Engineering for Autonomous Systems
071O	QinetiQ	Associate - Autonomous Systems (Live, Virtual, Constructive)	Understanding of Systems Engineering principles and their application across all stages of Through Life Engineering.	Engineering for Autonomous Systems
071O	QinetiQ	Associate - Autonomous Systems (Live, Virtual, Constructive)	Good analytical skills. Able to make evaluative judgements based on modelling and simulation or analysis of factual information.	Engineering for Autonomous Systems
071O	QinetiQ	Associate - Autonomous Systems (Live, Virtual, Constructive)	Ability to see beyond the obvious to find appropriate solutions and identify benefits and challenges of proposed options.	Engineering for Autonomous Systems

With the support of the Erasmus+ Programme of the European Union

No	Company name	Position	Requirements - Skills	Keyword
071O	QinetiQ	Associate - Autonomous Systems (Live, Virtual, Constructive)	Strong risk awareness and quality conscious. Able to follow applicable processes and procedures.	Engineering for Autonomous Systems
071O	QinetiQ	Associate - Autonomous Systems (Live, Virtual, Constructive)	Able to proactively anticipate possible problems and overcome obstacles.	Engineering for Autonomous Systems
071O	QinetiQ	Associate - Autonomous Systems (Live, Virtual, Constructive)	Innovative self-starter able to show initiative. We're looking for enthusiastic team players who can help develop concepts and solutions to our customers' challenges.	Engineering for Autonomous Systems
071O	QinetiQ	Associate - Autonomous Systems (Live, Virtual, Constructive)	Sound and comprehensive communications skills in order to exchange complex information both within the team and to external customers. Clear and concise written and oral communication skills are essential.	Engineering for Autonomous Systems
071O	QinetiQ	Associate - Autonomous Systems (Live, Virtual, Constructive)	Comfortable working as part of a technical team with delivery deadlines. Displays agility and adaptability to different teams and problems.	Engineering for Autonomous Systems
071O	QinetiQ	Associate - Autonomous Systems (Live, Virtual, Constructive)	Able to accept technical direction but also able and willing to contribute to technical planning and strategy.	Engineering for Autonomous Systems
073O	SES Satellites	Solutions Engineer	Technical knowledge: Proficiency in satellite transmission analysis and complex solution engineering. Extended knowledge of satellite design, Broadcasting technologies, VSAT networks, network architecture, access schemes, data networking, engineering software development and radio frequency propagation analysis;	Engineering for Autonomous Systems
073O	SES Satellites	Solutions Engineer	Technical knowledge: Proficiency in satellite antenna theory, satellite antenna tracking systems, Amplifier operation and satellite modem operation including understanding of DVBS2x, ACM and Modulation/Demodulation operation.	Engineering for Autonomous Systems
073O	SES Satellites	Solutions Engineer	Orchestration/Automation: Knowledge of multiple arrangement technologies/features in addition to automated operation of single/multiple tasks;	Engineering for Autonomous Systems
073O	SES Satellites	Solutions Engineer	Experience and knowledge of Internet Protocol (IP) networks, access routing, BGP/MPLS, IP Peering and SDN, networking technologies as well as international Carrier services;	Engineering for Autonomous Systems

With the support of the Erasmus+ Programme of the European Union

No	Company name	Position	Requirements - Skills	Keyword
073O	SES Satellites	Solutions Engineer	Understanding of Central and Edge architecture and impact to customer service/experience. Ability to discuss Big Data Analytics, Network Intelligence and Machine Learning, Service & Network Orchestration, Closed Loop Automation.	Engineering for Autonomous Systems
073O	SES Satellites	Solutions Engineer	Networking topology skills to include Network Functions Virtualization (NFV), Lifecycle Orchestration (LSO), Open Network Automation Platform (ONAP) and Management and Organization (MANO).	Engineering for Autonomous Systems
073O	SES Satellites	Solutions Engineer	Innovative thinking: Networking knowledge to a level whereby the integration of 5G services with Cloud Services will dramatically impact a customer's business or service;	Engineering for Autonomous Systems
073O	SES Satellites	Solutions Engineer	Excellent Negotiation & Communication skills: Ability to efficiently assist Sales in creating winning technical proposals. Good presentation techniques and effective sales proposal skills. Ability to work effectively in structured or virtual teams. Ability to speak with C level customer staff and drive technical strategic deals;	Engineering for Autonomous Systems
073O	SES Satellites	Solutions Engineer	Excellent Customer Relation skills: Build and maintain relationships with customers guides by the capture team leader to retain and grow revenues and margins as well as the ability to gain a clear understanding of the customers' businesses and requirements and be able to offer the customer bespoke advice upon forthcoming product developments or services that could lead to new sales and/or to service optimizations;	Engineering for Autonomous Systems
073O	SES Satellites	Solutions Engineer	Market intelligence & new technology developments: In this highly competitive market it is necessary to have an ongoing knowledge and understanding of the market and developments in the customer base. Specific trends or shifts in the market need to be monitored, tracked, analyzed and reported to management or other parts of the organization;	Engineering for Autonomous Systems
073O	SES Satellites	Solutions Engineer	Regional knowledge: With customers and staff located in different regions of the world, it is key to understand the variances within the region and as such the differences in market settings, customers' expectations & requirements to be able to determine the different necessary strategies;	Engineering for Autonomous Systems
073O	SES Satellites	Solutions Engineer	Talent for technology, interest in both theory and practical work	Engineering for Autonomous Systems

With the support of the Erasmus+ Programme of the European Union

No	Company name	Position	Requirements - Skills	Keyword
073O	SES Satellites	Solutions Engineer	Ability to interface with business and other technical areas within SES and work both autonomous and in interdisciplinary teams including ability to take responsibility for work packages and topics	Engineering for Autonomous Systems
073O	SES Satellites	Solutions Engineer	Writing skills for technical documents including specifications and studies	Engineering for Autonomous Systems
073O	SES Satellites	Solutions Engineer	Good communication skills and team-spirit	Engineering for Autonomous Systems
073O	SES Satellites	Solutions Engineer	Willingness to integrate into an international environment	Engineering for Autonomous Systems
073O	SES Satellites	Solutions Engineer	A demonstrated ability to work across organizational boundaries	Engineering for Autonomous Systems
073O	SES Satellites	Solutions Engineer	Knowledge of satellite transmission analysis and optimization;	Engineering for Autonomous Systems
073O	SES Satellites	Solutions Engineer	Knowledge of satellite access technologies and earth station components;	Engineering for Autonomous Systems
073O	SES Satellites	Solutions Engineer	Hands on knowledge of the design and architecture of Enterprise and Telecommunications Networks, including Fixed Data/Maritime/Aero/Energy; access networks implementation and operation including troubleshooting faults and service difficulties;	Engineering for Autonomous Systems
073O	SES Satellites	Solutions Engineer	Strong knowledge and experience in IP based networks and services;	Engineering for Autonomous Systems
073O	SES Satellites	Solutions Engineer	Global/Regional market experience and business cultural awareness;	Engineering for Autonomous Systems
073O	SES Satellites	Solutions Engineer	Knowledge of English is essential. Additional regional languages desirable;	Engineering for Autonomous Systems
073O	SES Satellites	Solutions Engineer	Excellent communication ability, both in written and verbal;	Engineering for Autonomous Systems
073O	SES Satellites	Solutions Engineer	Strong interpersonal, presentation and sales proposal skills;	Engineering for Autonomous Systems

With the support of the Erasmus+ Programme of the European Union

No	Company name	Position	Requirements - Skills	Keyword
073O	SES Satellites	Solutions Engineer	Willing to travel internationally and meet directly with clients;	Engineering for Autonomous Systems
073O	SES Satellites	Solutions Engineer	Ability to work effectively in a global high energy multicultural team;	Engineering for Autonomous Systems
073O	SES Satellites	Solutions Engineer	Knowledge of project financial structure and company financial structures an advantage;	Engineering for Autonomous Systems
074O	SES Satellites	(Senior) Engineer, Cloud & IT System Security	Ability to learn new technologies quickly	Engineering for Autonomous Systems
074O	SES Satellites	(Senior) Engineer, Cloud & IT System Security	Sound analytical skills as well as the ability to provide practical solutions	Engineering for Autonomous Systems
074O	SES Satellites	(Senior) Engineer, Cloud & IT System Security	Autonomous, innovative mind and good problem-solving skills	Engineering for Autonomous Systems
074O	SES Satellites	(Senior) Engineer, Cloud & IT System Security	Self-motivating with proven ability to deliver on complex and time critical tasks/projects	Engineering for Autonomous Systems
074O	SES Satellites	(Senior) Engineer, Cloud & IT System Security	Good project management and organization skills	Engineering for Autonomous Systems
074O	SES Satellites	(Senior) Engineer, Cloud & IT System Security	Ability to effectively interact with organizational stakeholders	Engineering for Autonomous Systems
074O	SES Satellites	(Senior) Engineer, Cloud & IT System Security	Understand all stakeholders in the information security process and possess the ability to explain security rationales and controls to non-technical audiences	Engineering for Autonomous Systems
074O	SES Satellites	(Senior) Engineer, Cloud & IT System Security	Ability to understand business requirements and work towards solutions, both autonomous and in teams	Engineering for Autonomous Systems
074O	SES Satellites	(Senior) Engineer, Cloud & IT System Security	Excellent team player and ability to work in international and interdisciplinary teams	Engineering for Autonomous Systems
074O	SES Satellites	(Senior) Engineer, Cloud & IT System Security	Ability to establish well-written, structured documents (e.g. designs and infrastructure documentation)	Engineering for Autonomous Systems
074O	SES Satellites	(Senior) Engineer, Cloud & IT System Security	Be fluent in English (any other language being an asset)	Engineering for Autonomous Systems
074O	SES Satellites	(Senior) Engineer, Cloud & IT System Security	Excellent written and verbal communication skills	Engineering for Autonomous Systems

With the support of the Erasmus+ Programme of the European Union

No	Company name	Position	Requirements - Skills	Keyword
074O	SES Satellites	(Senior) Engineer, Cloud & IT System Security	Managing system related security risks, including the assessment of system security risks, specification of security requirements, the definition of security concepts, secure system design, implementation of security controls, specification of secure configuration baselines, assessment of security controls and vulnerabilities	Engineering for Autonomous Systems
074O	SES Satellites	(Senior) Engineer, Cloud & IT System Security	Knowledge of Cloud Solutions (e.g., Azure, AWS, SalesForce, …)	Engineering for Autonomous Systems
074O	SES Satellites	(Senior) Engineer, Cloud & IT System Security	SSO/SAML, JSON, PowerShell, RestAPI, related scripting technologies advantageous	Engineering for Autonomous Systems
074O	SES Satellites	(Senior) Engineer, Cloud & IT System Security	Operating Systems (MS Windows and Linux), Citrix/VMWare and applications, including a clear understanding of their vulnerabilities and how to secure them	Engineering for Autonomous Systems
074O	SES Satellites	(Senior) Engineer, Cloud & IT System Security	Vulnerability, compliance and patch management for complex, heterogeneous systems	Engineering for Autonomous Systems
074O	SES Satellites	(Senior) Engineer, Cloud & IT System Security	Virtualization and Data Center technologies and corresponding security technologies	Engineering for Autonomous Systems
074O	SES Satellites	(Senior) Engineer, Cloud & IT System Security	Identity and Access Management and Strong Authentication Systems	Engineering for Autonomous Systems
074O	SES Satellites	(Senior) Engineer, Cloud & IT System Security	Public Key Infrastructure (e.g., Public Certificate Management, Internal Certificate Management, …)	Engineering for Autonomous Systems
074O	SES Satellites	(Senior) Engineer, Cloud & IT System Security	Anti-Virus and Host-based Intrusion Prevention Systems	Engineering for Autonomous Systems
074O	SES Satellites	(Senior) Engineer, Cloud & IT System Security	Security Information and Event Management	Engineering for Autonomous Systems
074O	SES Satellites	(Senior) Engineer, Cloud & IT System Security	Data Leakage Prevention	Engineering for Autonomous Systems
074O	SES Satellites	(Senior) Engineer, Cloud & IT System Security	Security standards, best practices and guidelines (e.g., NIST SP-800 series, DISA STIGs, CIS, etc.)	Engineering for Autonomous Systems
074O	SES Satellites	(Senior) Engineer, Cloud & IT System Security	Relevant product and general security certifications (e.g., AWS-CSA, GCWN, MCSE-Cloud, CompTIA Cloud, GCED, GCUX, GCIH, GISP, CISSP-ISSEP, CISSP-ISSAP, GPEN, CEH) and knowledge of the satellite industry are a plus	Engineering for Autonomous Systems

With the support of the Erasmus+ Programme of the European Union

No	Company name	Position	Requirements - Skills	Keyword
074O	SES Satellites	(Senior) Engineer, Cloud & IT System Security	Solid knowledge of IT security threats, vulnerabilities, security technologies, controls and best practices	Engineering for Autonomous Systems
074O	SES Satellites	(Senior) Engineer, Cloud & IT System Security	NATO/EU SECRET clearances are considered a strong asset. Candidate must be willing to undergo a security clearance procedure as this position might require holding security clearance	Engineering for Autonomous Systems
076O	ALTEN LTD	Signalling Software engineer - Rail	Software architecture understanding	Engineering for Autonomous Systems
076O	ALTEN LTD	Signalling Software engineer - Rail	Requirement engineering	Engineering for Autonomous Systems
076O	ALTEN LTD	Signalling Software engineer - Rail	ERTMS knowledge	Engineering for Autonomous Systems
076O	ALTEN LTD	Signalling Software engineer - Rail	ETCS Design Trackside Testing	Engineering for Autonomous Systems
076O	ALTEN LTD	Signalling Software engineer - Rail	Verification and validation	Engineering for Autonomous Systems
076O	ALTEN LTD	Signalling Software engineer - Rail	C++	Engineering for Autonomous Systems
076O	ALTEN LTD	Signalling Software engineer - Rail	High level communication skills	Engineering for Autonomous Systems
076O	ALTEN LTD	Signalling Software engineer - Rail	Solutions oriented mind-set	Engineering for Autonomous Systems
076O	ALTEN LTD	Signalling Software engineer - Rail	Strong abilities to work under pressure	Engineering for Autonomous Systems
076O	ALTEN LTD	Signalling Software engineer - Rail	Autonomous technical project management abilities	Engineering for Autonomous Systems
076O	ALTEN LTD	Signalling Software engineer - Rail	Abilities to work and progress in a cross-functional environment	Engineering for Autonomous Systems
078O	Thales	Innovation Specialist	Very good knowledge in linear optimisation	Engineering for Autonomous Systems

With the support of the Erasmus+ Programme of the European Union

No	Company name	Position	Requirements - Skills	Keyword
078O	Thales	Innovation Specialist	Very good knowledge in VO and SLAM	Engineering for Autonomous Systems
078O	Thales	Innovation Specialist	Very good knowledge in rt object recognition with and without deep learning approaches	Engineering for Autonomous Systems
078O	Thales	Innovation Specialist	Very good knowledge in OO-Programming and of use of design pattern	Engineering for Autonomous Systems
078O	Thales	Innovation Specialist	Very good knowledge in C/C++ and Java or similar languages	Engineering for Autonomous Systems
078O	Thales	Innovation Specialist	Very good knowledge in Matlab	Engineering for Autonomous Systems
078O	Thales	Innovation Specialist	Experience in evaluation of data and understanding in hardware is desirable	Engineering for Autonomous Systems
078O	Thales	Innovation Specialist	Minimum French Basics	Engineering for Autonomous Systems
078O	Thales	Innovation Specialist	You are communicative, transparent and like to work in teams.	
079O	European Space Agency	Internal Research Fellow (PostDoc) in Advanced Onboard Image Processing and Computational Imaging	Ability to conduct research autonomously	Engineering for Autonomous Systems
079O	European Space Agency	Internal Research Fellow (PostDoc) in Advanced Onboard Image Processing and Computational Imaging	Breadth of exposure coming from past and/or current research/activities	Engineering for Autonomous Systems
079O	European Space Agency	Internal Research Fellow (PostDoc) in Advanced Onboard Image Processing and Computational Imaging	Research/publication record	Engineering for Autonomous Systems
079O	European Space Agency	Internal Research Fellow (PostDoc) in Advanced	Knowledge relevant to the field of research	Engineering for Autonomous Systems

With the support of the Erasmus+ Programme of the European Union

No	Company name	Position	Requirements - Skills	Keyword
		Onboard Image Processing and Computational Imaging		
079O	European Space Agency	Internal Research Fellow (PostDoc) in Advanced Onboard Image Processing and Computational Imaging	General interest in space and space research	Engineering for Autonomous Systems
079O	European Space Agency	Internal Research Fellow (PostDoc) in Advanced Onboard Image Processing and Computational Imaging	Ability to gather and share relevant information	Engineering for Autonomous Systems
079O	European Space Agency	Internal Research Fellow (PostDoc) in Advanced Onboard Image Processing and Computational Imaging	Innovation & Creativity	Engineering for Autonomous Systems
079O	European Space Agency	Internal Research Fellow (PostDoc) in Advanced Onboard Image Processing and Computational Imaging	Continuous Learning	Engineering for Autonomous Systems
079O	European Space Agency	Internal Research Fellow (PostDoc) in Advanced Onboard Image Processing and Computational Imaging	Relationship Management	Engineering for Autonomous Systems
079O	European Space Agency	Internal Research Fellow (PostDoc) in Advanced Onboard Image Processing and Computational Imaging	Self Motivation	Engineering for Autonomous Systems
079O	European Space Agency	Internal Research Fellow (PostDoc) in Advanced Onboard Image Processing and Computational Imaging	Communication	Engineering for Autonomous Systems

With the support of the Erasmus+ Programme of the European Union

No	Company name	Position	Requirements - Skills	Keyword
079O	European Space Agency	Internal Research Fellow (PostDoc) in Advanced Onboard Image Processing and Computational Imaging	Problem Solving	Engineering for Autonomous Systems
082O	Vitrociset Belgium	GNC Engineer	Proven experience in the design, tuning, analysis and simulation of GNC systems in different project phases;	Engineering for Autonomous Systems
082O	Vitrociset Belgium	GNC Engineer	Proven knowledge of modern control design methods, commercial model-based design tools (MATLAB);	Engineering for Autonomous Systems
082O	Vitrociset Belgium	GNC Engineer	Experience with rapid-prototyping of hardware-in-the-loop systems;	Engineering for Autonomous Systems
082O	Vitrociset Belgium	GNC Engineer	Fluency in English (both written and spoken) is mandatory; knowledge of another European language is an advantage.	Engineering for Autonomous Systems
086O	g2 Recruitment Solutions	Computer Vision Engineer	Expertise in coding both Python and C++, with a proven track-record in SW Engineering	Engineering for Autonomous Systems
086O	g2 Recruitment Solutions	Computer Vision Engineer	Hands-on experience algorithm development within visual odometry and SLAM (DSO, VSO, ORBSLAM, or similar)	Engineering for Autonomous Systems
086O	g2 Recruitment Solutions	Computer Vision Engineer	Working knowledge of 3D geometries and optimization methods	Engineering for Autonomous Systems
086O	g2 Recruitment Solutions	Computer Vision Engineer	Working knowledge of 3D Pointcloud & Image processing (OpenCV, OpenGL, Open3d, ...)	Engineering for Autonomous Systems
086O	g2 Recruitment Solutions	Computer Vision Engineer	Fluency in English	Engineering for Autonomous Systems
087O	Thales	Proxy Product Owner-Space Business	Product engineering skills, experienced in writing requirements: formal specifications, user stories	Engineering for Autonomous Systems
087O	Thales	Proxy Product Owner-Space Business	Familiar with product line engineering practices: production plan, strategic, reuse, core assets, product scope	Engineering for Autonomous Systems
087O	Thales	Proxy Product Owner-Space Business	Knowledge in tools like Git, ClearQuest, Jira	Engineering for Autonomous Systems
087O	Thales	Proxy Product Owner-Space Business	Experience with project management concerns: estimations, planning, resource management	Engineering for Autonomous Systems

With the support of the Erasmus+ Programme of the European Union

No	Company name	Position	Requirements - Skills	Keyword
087O	Thales	Proxy Product Owner-Space Business	Highly proficient in spoken and written English	Engineering for Autonomous Systems
087O	Thales	Proxy Product Owner-Space Business	Capacity to plan and control a planning	Engineering for Autonomous Systems
087O	Thales	Proxy Product Owner-Space Business	Initiative and innovation capacity	Engineering for Autonomous Systems
087O	Thales	Proxy Product Owner-Space Business	Capacity to analyze a problem and solve it	Engineering for Autonomous Systems
087O	Thales	Proxy Product Owner-Space Business	Risk management capacity	Engineering for Autonomous Systems
087O	Thales	Proxy Product Owner-Space Business	Synthesis and reporting capacity	Engineering for Autonomous Systems
087O	Thales	Proxy Product Owner-Space Business	Leadership skills	Engineering for Autonomous Systems
087O	Thales	Proxy Product Owner-Space Business	Knowledge of the preparation of the specifications and object-oriented design	Engineering for Autonomous Systems
087O	Thales	Proxy Product Owner-Space Business	Knowledge of AGILE / Lean methods	Engineering for Autonomous Systems
087O	Thales	Proxy Product Owner-Space Business	Intercultural communication, including the empathy to work in an international team	Engineering for Autonomous Systems
087O	Thales	Proxy Product Owner-Space Business	Solution oriented while being open to embrace new technologies	Engineering for Autonomous Systems
087O	Thales	Proxy Product Owner-Space Business	Flexibility and availability to travel abroad from time to time	Engineering for Autonomous Systems
087O	Thales	Proxy Product Owner-Space Business	Highly proficient in spoken and written English	Engineering for Autonomous Systems
088O	Cirrus Selection Limited	Principal Mechanical Design Engineer - Future Concepts	Capable of managing work packages, rapid development activities and autonomous working.	Engineering for Autonomous Systems

With the support of the Erasmus+ Programme of the European Union

No	Company name	Position	Requirements - Skills	Keyword
088O	Cirrus Selection Limited	Principal Mechanical Design Engineer - Future Concepts	Strong communication skills, both written and verbal with the ability to influence and negotiate with stakeholders across the business.	Engineering for Autonomous Systems
088O	Cirrus Selection Limited	Principal Mechanical Design Engineer - Future Concepts	You will have a willing, helpful attitude and a calm professional manner, able to set priorities and deal with multiple issues.	Engineering for Autonomous Systems
088O	Cirrus Selection Limited	Principal Mechanical Design Engineer - Future Concepts	Have the awareness and understanding of cultural differences with the ability to adapt accordingly.	Engineering for Autonomous Systems
088O	Cirrus Selection Limited	Principal Mechanical Design Engineer - Future Concepts	An understanding of the Structural and Thermal considerations of Mechanical Design	Engineering for Autonomous Systems
088O	Cirrus Selection Limited	Principal Mechanical Design Engineer - Future Concepts	Wider awareness of other disciplines such as Electronic Packaging, Aerodynamics and Low Observability, would be beneficial	Engineering for Autonomous Systems
088O	Cirrus Selection Limited	Principal Mechanical Design Engineer - Future Concepts	Relevant 3D CAD/CAE experience (training on our preferred CAE tools will be given).	Engineering for Autonomous Systems
090O	Thales	Hardware Product/ System Architect	Computer literate with extensive experience using development tools such as Engineering Development Tools (PCM, DOORS), a Configuration Management tool and Microsoft Office suite	Engineering for Autonomous Systems
090O	Thales	Hardware Product/ System Architect	Ideally experience in the development of safety critical systems	Engineering for Autonomous Systems
090O	Thales	Hardware Product/ System Architect	Ideally knowledge in environmental qualification (climatic, EMI/ EMC)	Engineering for Autonomous Systems
090O	Thales	Hardware Product/ System Architect	Experience to work in interdisciplinary teams (hardware, software, test, product management)	Engineering for Autonomous Systems
090O	Thales	Hardware Product/ System Architect	Well-developed verbal skills to interact effectively and professionally in a variety of forums	Engineering for Autonomous Systems

With the support of the Erasmus+ Programme of the European Union

No	Company name	Position	Requirements - Skills	Keyword
090O	Thales	Hardware Product/ System Architect	Well-developed writing skills to prepare effective reports, documents, etc. in a clear and concise format	Engineering for Autonomous Systems
090O	Thales	Hardware Product/ System Architect	Highly flexible team player, organized, motivated	Engineering for Autonomous Systems
090O	Thales	Hardware Product/ System Architect	Very good English skills	Engineering for Autonomous Systems
091O	Raytheon Technologies	Sr. C++ Autonomous Vehicle Software Engineer	Experience with C++ and Linux/UNIX	Engineering for Autonomous Systems
091O	Raytheon Technologies	Sr. C++ Autonomous Vehicle Software Engineer	Strong Object-Oriented Knowledge	Engineering for Autonomous Systems
091O	Raytheon Technologies	Sr. C++ Autonomous Vehicle Software Engineer	Experience developing software in a team-based development environment	Engineering for Autonomous Systems
091O	Raytheon Technologies	Sr. C++ Autonomous Vehicle Software Engineer	US Citizenship is required	Engineering for Autonomous Systems
091O	Raytheon Technologies	Sr. C++ Autonomous Vehicle Software Engineer	Broad software development experience, including unit testing, real-time, or working in a DoD environment	Engineering for Autonomous Systems
091O	Raytheon Technologies	Sr. C++ Autonomous Vehicle Software Engineer	Experience in Agile development methods, including Scrum, automated testing and continuous integration	Engineering for Autonomous Systems
091O	Raytheon Technologies	Sr. C++ Autonomous Vehicle Software Engineer	Radar or Sonar domain knowledge	Engineering for Autonomous Systems
091O	Raytheon Technologies	Sr. C++ Autonomous Vehicle Software Engineer	Familiarity with the following Software Tools: Version control tools (e.g. Github), Jira, Jenkins	Engineering for Autonomous Systems
091O	Raytheon Technologies	Sr. C++ Autonomous Vehicle Software Engineer	Strong problem solving ability	Engineering for Autonomous Systems
091O	Raytheon Technologies	Sr. C++ Autonomous Vehicle Software Engineer	Self-starter and ability to lead development, integration and test activities	Engineering for Autonomous Systems
092O	SES Satellites	(Senior) Analyst, Cyber Security Monitoring and Incident Response	Good experience in security monitoring (SIEM) including analysing and triaging of security events from various sources	Engineering for Autonomous Systems

With the support of the Erasmus+ Programme of the European Union

No	Company name	Position	Requirements - Skills	Keyword
092O	SES Satellites	(Senior) Analyst, Cyber Security Monitoring and Incident Response	Experience in managing security incidents	Engineering for Autonomous Systems
092O	SES Satellites	(Senior) Analyst, Cyber Security Monitoring and Incident Response	Knowledge of and hands-on experience with state of the art incident response and forensics tools, techniques and tactics	Engineering for Autonomous Systems
092O	SES Satellites	(Senior) Analyst, Cyber Security Monitoring and Incident Response	Experienced in capturing memory, disk images and network traffic and analysing them for indicators of compromise	Engineering for Autonomous Systems
092O	SES Satellites	(Senior) Analyst, Cyber Security Monitoring and Incident Response	Good programming and scripting skills in different programming/scripting languages would be an advantage	Engineering for Autonomous Systems
092O	SES Satellites	(Senior) Analyst, Cyber Security Monitoring and Incident Response	Good understanding of the tools and tactics used by different threat agents	Engineering for Autonomous Systems
092O	SES Satellites	(Senior) Analyst, Cyber Security Monitoring and Incident Response	Knowledge of computer forensics, security vulnerabilities and exploits	Engineering for Autonomous Systems
092O	SES Satellites	(Senior) Analyst, Cyber Security Monitoring and Incident Response	Knowledge in system security, application security and network security	Engineering for Autonomous Systems
092O	SES Satellites	(Senior) Analyst, Cyber Security Monitoring and Incident Response	Knowledge of security technologies, such as Antivirus, Network and Host Intrusion Detection Systems, Web Proxy/Content Filtering, Authentication technologies, Security Information and Event Management	Engineering for Autonomous Systems
092O	SES Satellites	(Senior) Analyst, Cyber Security Monitoring and Incident Response	Experience with a top tier SIEM solution (e.g., HP Arcsight, IBM QRadar, Splunk for Security, EMC/RSA Security Analytics) is a plus	Engineering for Autonomous Systems
092O	SES Satellites	(Senior) Analyst, Cyber Security Monitoring and Incident Response	Relevant security certifications (e.g., GCIH, GCFE, GCFA, GREM, GCIA) and product certifications are a plus	Engineering for Autonomous Systems

With the support of the Erasmus+ Programme of the European Union

No	Company name	Position	Requirements - Skills	Keyword
092O	SES Satellites	(Senior) Analyst, Cyber Security Monitoring and Incident Response	Experience in malware analysis and reverse engineering would be an advantage	Engineering for Autonomous Systems
092O	SES Satellites	(Senior) Analyst, Cyber Security Monitoring and Incident Response	Fluency in English, any other language is considered as an asset	Engineering for Autonomous Systems
092O	SES Satellites	(Senior) Analyst, Cyber Security Monitoring and Incident Response	Willingness to travel internationally	Engineering for Autonomous Systems
092O	SES Satellites	(Senior) Analyst, Cyber Security Monitoring and Incident Response	Very good analytical and problem-solving skills	Engineering for Autonomous Systems
092O	SES Satellites	(Senior) Analyst, Cyber Security Monitoring and Incident Response	Autonomous with strong self-management skills	Engineering for Autonomous Systems
092O	SES Satellites	(Senior) Analyst, Cyber Security Monitoring and Incident Response	Good coordination and project management skills	Engineering for Autonomous Systems
092O	SES Satellites	(Senior) Analyst, Cyber Security Monitoring and Incident Response	Innovative mind	Engineering for Autonomous Systems
092O	SES Satellites	(Senior) Analyst, Cyber Security Monitoring and Incident Response	Stress resistant and able to manage multiple incidents and tasks at the same time	Engineering for Autonomous Systems
092O	SES Satellites	(Senior) Analyst, Cyber Security Monitoring and Incident Response	Good written and verbal communication skills	Engineering for Autonomous Systems
092O	SES Satellites	(Senior) Analyst, Cyber Security Monitoring and Incident Response	Excellent team player	Engineering for Autonomous Systems

With the support of the Erasmus+ Programme of the European Union

No	Company name	Position	Requirements - Skills	Keyword
092O	SES Satellites	(Senior) Analyst, Cyber Security Monitoring and Incident Response	Ability to effectively interact with all organization stakeholders	Engineering for Autonomous Systems
093O	Raytheon Technologies	Sr. Engineering Logistics Specialist II-Marlborough, Massachusetts	Demonstrated ability to plan, organize, coordinate, integrate, execute, and manage all logistics tasks and to analyze and resolve logistics problems relating to operational considerations.	Engineering for Autonomous Systems
093O	Raytheon Technologies	Sr. Engineering Logistics Specialist II-Marlborough, Massachusetts	Demonstrated skills to include analyzing engineering/systems management data, developing logistics plans and procedures, developing logistics management plans and guidelines.	Engineering for Autonomous Systems
093O	Raytheon Technologies	Sr. Engineering Logistics Specialist II-Marlborough, Massachusetts	Demonstrated ability to perform Failure Reporting, Analysis and Corrective Action (FRACA) analysis to include generating FRACA plans and failure summary reports.	Engineering for Autonomous Systems
093O	Raytheon Technologies	Sr. Engineering Logistics Specialist II-Marlborough, Massachusetts	Experience with supporting Failure Review Boards (FRBs), leading Failure Investigation Teams (FITs), and performing root cause analysis to identify corrective actions.	Engineering for Autonomous Systems
093O	Raytheon Technologies	Sr. Engineering Logistics Specialist II-Marlborough, Massachusetts	Demonstrated ability to lead and manage teams.	Engineering for Autonomous Systems
093O	Raytheon Technologies	Sr. Engineering Logistics Specialist II-Marlborough, Massachusetts	Experience with MIL-HDBK-502, MIL-PRF-49506, MIL-STD-1369, MIL-STD-1388, Integrated Product Support Handbook or equivalent industry standards, practices, or methods.	Engineering for Autonomous Systems
093O	Raytheon Technologies	Sr. Engineering Logistics Specialist II-Marlborough, Massachusetts	U.S. Citizen with the ability to obtain and maintain a DoD SECRET Security Clearance.	Engineering for Autonomous Systems
093O	Raytheon Technologies	Sr. Engineering Logistics Specialist II-Marlborough, Massachusetts	Experience working with Army Reset & Refurb, Depot Support, and Production facility processes	Engineering for Autonomous Systems
093O	Raytheon Technologies	Sr. Engineering Logistics Specialist II-Marlborough, Massachusetts	Self-starter – proactive in determining goals, objectives and pursuing the necessary course of action. Highly motivated, energetic, comfortable with initiating interaction with engineering, management and customers.	Engineering for Autonomous Systems

With the support of the Erasmus+ Programme of the European Union

No	Company name	Position	Requirements - Skills	Keyword
093O	Raytheon Technologies	Sr. Engineering Logistics Specialist II-Marlborough, Massachusetts	Familiar with logistics tools and metrics.	Engineering for Autonomous Systems
093O	Raytheon Technologies	Sr. Engineering Logistics Specialist II-Marlborough, Massachusetts	Capable of collecting, organizing, and preparing technical data/documents for review.	Engineering for Autonomous Systems
093O	Raytheon Technologies	Sr. Engineering Logistics Specialist II-Marlborough, Massachusetts	Experience with Earned Value Management System (EVMS) principles, e.g., CPI, SPI, TCPI, etc.	Engineering for Autonomous Systems
093O	Raytheon Technologies	Sr. Engineering Logistics Specialist II-Marlborough, Massachusetts	Experience conducting trade studies.	Engineering for Autonomous Systems
093O	Raytheon Technologies	Sr. Engineering Logistics Specialist II-Marlborough, Massachusetts	Experience in preparing Basis of Estimates (BOE).	Engineering for Autonomous Systems
094O	Thales	IVVQ Engineer	Experience in integration and verification testing of medium and large hardware and software systems; experience in classified systems verification would be an advantage.	Engineering for Autonomous Systems
094O	Thales	IVVQ Engineer	Network expertise for configuration, architecture and analysis in a Linux or LynxOS environment, TCP/IP protocols, firewall and switch configuration and management is mandatory.	Engineering for Autonomous Systems
094O	Thales	IVVQ Engineer	Proven knowledge in scripting languages (JavaScript, bash, Python) is mandatory, SW engineering and programming in C/C++ an advantage.	Engineering for Autonomous Systems
094O	Thales	IVVQ Engineer	Practical experience with database systems as MySQL, PostgreSQL or MariaDB.	Engineering for Autonomous Systems
094O	Thales	IVVQ Engineer	Experience in setup, modification and usage of computer hardware and virtualisation.	Engineering for Autonomous Systems
095O	Cirrus Selection	Guidance Control & Navigation Engineer	Relevant experience of applicable algorithms i.e. Guidance, Control, Data Fusion, Navigation, Image Processing.	Engineering for Autonomous Systems
095O	Cirrus Selection	Guidance Control & Navigation Engineer	flight dynamics and aerodynamics	Engineering for Autonomous Systems

With the support of the Erasmus+ Programme of the European Union

No	Company name	Position	Requirements - Skills	Keyword
095O	Cirrus Selection	Guidance Control & Navigation Engineer	sensors (e.g. IMUs, GPS, RF and IR seekers)	Engineering for Autonomous Systems
095O	Cirrus Selection	Guidance Control & Navigation Engineer	actuation systems in relation to autopilot design and servo control.	Engineering for Autonomous Systems
095O	Cirrus Selection	Guidance Control & Navigation Engineer	The MathWorks products – specifically Simulink, Embedded MATLAB and Stateflow	Engineering for Autonomous Systems
095O	Cirrus Selection	Guidance Control & Navigation Engineer	C, FORTRAN and Ada	Engineering for Autonomous Systems
096O	Thales	Technical Project Manager (m/f/d) Digital Field Elements	Experience in Project Management and Hardware Engineering	Engineering for Autonomous Systems
096O	Thales	Technical Project Manager (m/f/d) Digital Field Elements	Experience in Hardware-Hardware, Hardware-Software integration	Engineering for Autonomous Systems
096O	Thales	Technical Project Manager (m/f/d) Digital Field Elements	Excellent analytical, communication, organizational and PC skills required	Engineering for Autonomous Systems
096O	Thales	Technical Project Manager (m/f/d) Digital Field Elements	High ability to work in a team and enjoy working in interdisciplinary teams	Engineering for Autonomous Systems
096O	Thales	Technical Project Manager (m/f/d) Digital Field Elements	Team work, Flexibility, Highly organized	Engineering for Autonomous Systems
096O	Thales	Technical Project Manager (m/f/d) Digital Field Elements	Good level in German and English language	Engineering for Autonomous Systems
097O	Thales	System Architect Railway Traffic Management	Good knowledge of railway operations and the products	Engineering for Autonomous Systems
097O	Thales	System Architect Railway Traffic Management	Experience in technical analysis and description of complex systems	Engineering for Autonomous Systems

With the support of the Erasmus+ Programme of the European Union

No	Company name	Position	Requirements - Skills	Keyword
097O	Thales	System Architect Railway Traffic Management	Ability to work in international teams and to capture and share complex context	Engineering for Autonomous Systems
097O	Thales	System Architect Railway Traffic Management	Very good communication skills	Engineering for Autonomous Systems
097O	Thales	System Architect Railway Traffic Management	Experience with system architectures and functions of traffic management systems	Engineering for Autonomous Systems
097O	Thales	System Architect Railway Traffic Management	Very good knowledge of modern HMI, web-based environments and big data applications	Engineering for Autonomous Systems
097O	Thales	System Architect Railway Traffic Management	Good knowledge of requirements engineering and system modeling (Doors, modeling tools)	Engineering for Autonomous Systems
097O	Thales	System Architect Railway Traffic Management	Good knowledge of approval procedures and relevant standards are beneficial	Engineering for Autonomous Systems
097O	Thales	System Architect Railway Traffic Management	Good knowledge of Agile, Lean beneficial (Scrum)	Engineering for Autonomous Systems
097O	Thales	System Architect Railway Traffic Management	Very good knowledge of spoken and written English	Engineering for Autonomous Systems
098O	Thales	Electronic Engineer for High Frequency	Knowledge of CAE system (schematics, PBA), PBA routing notions with design SW (MENTOR, ORCAD, ICEDA, XPEDITION)	Engineering for Autonomous Systems
098O	Thales	Electronic Engineer for High Frequency	Basic Knowledge on Electronics Components (Space/COTS)	Engineering for Autonomous Systems
098O	Thales	Electronic Engineer for High Frequency	High English level (French as important asset)	Engineering for Autonomous Systems
098O	Thales	Electronic Engineer for High Frequency	Good Communication skills, always in contact with internal and external customers.	Engineering for Autonomous Systems
098O	Thales	Electronic Engineer for High Frequency	Autonomous and problem-solving capacity	Engineering for Autonomous Systems
098O	Thales	Electronic Engineer for High Frequency	Proactive and strongly oriented to teamwork.	Engineering for Autonomous Systems
098O	Thales	Electronic Engineer for High Frequency	Flexible to understand the root causes of problems and rigorous to evaluate the best solution and ability to discuss, evaluate and implement best solutions.	Engineering for Autonomous Systems

With the support of the Erasmus+ Programme of the European Union

No	Company name	Position	Requirements - Skills	Keyword
098O	Thales	Electronic Engineer for High Frequency	Availability to travel and to spend some time abroad.	Engineering for Autonomous Systems
099O	Smiths Interconnect	Quality Engineer	Self-starter, energetic, team player and a good problem solver.	Engineering for Autonomous Systems
099O	Smiths Interconnect	Quality Engineer	Experience in Product assembly and testing against commercial, avionic & military standards.	Engineering for Autonomous Systems
099O	Smiths Interconnect	Quality Engineer	Knowledge in Quality Management Systems (ISO9001 and AS9100 as a minimum).	Engineering for Autonomous Systems
099O	Smiths Interconnect	Quality Engineer	Root cause analysis training.	Engineering for Autonomous Systems
099O	Smiths Interconnect	Quality Engineer	Strong verbal and written communication skills in English and French.	Engineering for Autonomous Systems
099O	Smiths Interconnect	Quality Engineer	Be extremely detail oriented.	Engineering for Autonomous Systems
099O	Smiths Interconnect	Quality Engineer	Comfortable in a very fast-paced environment with high degrees of autonomy.	Engineering for Autonomous Systems
099O	Smiths Interconnect	Quality Engineer	Experience operating in a clean room environment.	Engineering for Autonomous Systems
099O	Smiths Interconnect	Quality Engineer	Six Sigma Green Belt training.	Engineering for Autonomous Systems
099O	Smiths Interconnect	Quality Engineer	Solid optoelectronics knowledge, telecom knowledge and experience with optical transceivers (IEEE802.3ba).	Engineering for Autonomous Systems
099O	Smiths Interconnect	Quality Engineer	Internal or External ISO/AS auditor background	Engineering for Autonomous Systems
099O	Smiths Interconnect	Quality Engineer	Experience in Military or Aeronautic quality standards (Ex: Advanced Product Quality Planning)	Engineering for Autonomous Systems
099O	Smiths Interconnect	Quality Engineer	Individuals with strong manufacturing backgrounds are preferred.	Engineering for Autonomous Systems
099O	Smiths Interconnect	Quality Engineer	Ability to travel domestically and internationally as needed.	Engineering for Autonomous Systems

With the support of the Erasmus+ Programme of the European Union

No	Company name	Position	Requirements - Skills	Keyword
100O	Thales	Java Technical Lead-Space Business (MTG Project)	Undertakes the design and development of applications using templates and tools.	Engineering for Autonomous Systems
100O	Thales	Java Technical Lead-Space Business (MTG Project)	Assists as part of the team on the design of components of larger systems.	Engineering for Autonomous Systems
100O	Thales	Java Technical Lead-Space Business (MTG Project)	Produces detailed designs including, for example, physical data flows, file layouts, common routines and utilities, program specifications or prototypes and backup, recovery and restart procedures.	Engineering for Autonomous Systems
100O	Thales	Java Technical Lead-Space Business (MTG Project)	Puts skills and project based experience into practice and provides support to less experienced colleagues.	Engineering for Autonomous Systems
100O	Thales	Java Technical Lead-Space Business (MTG Project)	Helps with code reviews, technical guidance and various technical investigations	Engineering for Autonomous Systems
100O	Thales	Java Technical Lead-Space Business (MTG Project)	Work together with the PO to transform the business needs into technical requirements	Engineering for Autonomous Systems
100O	Thales	Java Technical Lead-Space Business (MTG Project)	You want your work to have a purpose	Engineering for Autonomous Systems
100O	Thales	Java Technical Lead-Space Business (MTG Project)	You have an analytical thinking and a thirst for innovation	Engineering for Autonomous Systems
100O	Thales	Java Technical Lead-Space Business (MTG Project)	You have creativity, originality and initiative	Engineering for Autonomous Systems
100O	Thales	Java Technical Lead-Space Business (MTG Project)	You are resourceful and solution oriented	Engineering for Autonomous Systems
100O	Thales	Java Technical Lead-Space Business (MTG Project)	You are able to adapt and react to change	Engineering for Autonomous Systems
100O	Thales	Java Technical Lead-Space Business (MTG Project)	You are a team player but you also take ownership for your decisions	Engineering for Autonomous Systems
100O	Thales	Java Technical Lead-Space Business (MTG Project)	You embrace autonomous and multicultural ways of working	Engineering for Autonomous Systems
100O	Thales	Java Technical Lead-Space Business (MTG Project)	You are self-aware and you work on developing your leadership skills and social influence	Engineering for Autonomous Systems

With the support of the Erasmus+ Programme of the European Union

No	Company name	Position	Requirements - Skills	Keyword
100O	Thales	Java Technical Lead-Space Business (MTG Project)	Finally, you like challenges and are willing to take part in the growth of the global engineering competence centre in Romania - you are the person we are looking for!	Engineering for Autonomous Systems
101O	Thales	Workbench Architect for Engineering Environment	uccessful study of applied computer science or similar	Engineering for Autonomous Systems
101O	Thales	Workbench Architect for Engineering Environment	Experiences in software provisioning and automation using Ansible, Docker and Jenkins	Engineering for Autonomous Systems
101O	Thales	Workbench Architect for Engineering Environment	Experiences in Linux, OpenStack, Ceph and CloudFoundry/Kubernetes	Engineering for Autonomous Systems
101O	Thales	Workbench Architect for Engineering Environment	Experience with agile development methods (Scrum)	Engineering for Autonomous Systems
101O	Thales	Workbench Architect for Engineering Environment	Team player and willingness to travel	Engineering for Autonomous Systems
101O	Thales	Workbench Architect for Engineering Environment	English – business fluent	Engineering for Autonomous Systems
102O	Thales	Product Line Architect (m/f/d) Digital Field Elements Subsystems	Experience in field element control solutions and field elements (point, Light, IO) recommended	Engineering for Autonomous Systems
102O	Thales	Product Line Architect (m/f/d) Digital Field Elements Subsystems	High developed Engineering skills	Engineering for Autonomous Systems
102O	Thales	Product Line Architect (m/f/d) Digital Field Elements Subsystems	Well-developed verbal skills to interact effectively and professionally in a variety of forums	Engineering for Autonomous Systems
102O	Thales	Product Line Architect (m/f/d) Digital Field Elements Subsystems	Well-developed writing skills to prepare effective reports, documents, etc. in a clear and concise format	Engineering for Autonomous Systems
102O	Thales	Product Line Architect (m/f/d) Digital Field Elements Subsystems	Highly flexible team player, organized, motivated	Engineering for Autonomous Systems

With the support of the Erasmus+ Programme of the European Union

No	Company name	Position	Requirements - Skills	Keyword
102O	Thales	Product Line Architect (m/f/d) Digital Field Elements Subsystems	Very good English skills	Engineering for Autonomous Systems
103O	Thales	Head of Point Machine Product & Mechanical Development	Experience in complex rail signaling architecture	Engineering for Autonomous Systems
103O	Thales	Head of Point Machine Product & Mechanical Development	Experience in Point Machine products recommended	Engineering for Autonomous Systems
103O	Thales	Head of Point Machine Product & Mechanical Development	Preferable experience in safety critical transportation environment incl. the approval process	Engineering for Autonomous Systems
103O	Thales	Head of Point Machine Product & Mechanical Development	Knowledge of corresponding Standards (AREMA, CENELEC)	Engineering for Autonomous Systems
103O	Thales	Head of Point Machine Product & Mechanical Development	Lean & Agile Thinking	Engineering for Autonomous Systems
103O	Thales	Head of Point Machine Product & Mechanical Development	Strong in performance through cooperation and able influence key stakeholder	Engineering for Autonomous Systems
103O	Thales	Head of Point Machine Product & Mechanical Development	Excellent communicator and negotiator	Engineering for Autonomous Systems
103O	Thales	Head of Point Machine Product & Mechanical Development	Structured and well organized	Engineering for Autonomous Systems
103O	Thales	Head of Point Machine Product & Mechanical Development	Able to engage and develop teams	Engineering for Autonomous Systems

With the support of the Erasmus+ Programme of the European Union

No	Company name	Position	Requirements - Skills	Keyword
103O	Thales	Head of Point Machine Product & Mechanical Development	Good English skills	Engineering for Autonomous Systems
104O	Smiths Interconnect	Electronic Engineer	Candidates must know how to use a Product Life Cycle Management Software	Engineering for Autonomous Systems
104O	Smiths Interconnect	Electronic Engineer	Communicate perfectly in English & adequately in French (spoken and written)	Engineering for Autonomous Systems
104O	Smiths Interconnect	Electronic Engineer	Candidates must have experience interacting with customers	Engineering for Autonomous Systems
104O	Smiths Interconnect	Electronic Engineer	Comfortable in a very fast-paced environment with high degrees of autonomy	Engineering for Autonomous Systems
105O	Thales	C++ Engineer-Transportation Business (EAM Project)	Experience in C++ with STL (Standard Template Library)	Engineering for Autonomous Systems
105O	Thales	C++ Engineer-Transportation Business (EAM Project)	Experience with Real-Time Operating Systems (RTOS)	Engineering for Autonomous Systems
105O	Thales	C++ Engineer-Transportation Business (EAM Project)	Experience in UML Diagrams and Patterns	Engineering for Autonomous Systems
105O	Thales	C++ Engineer-Transportation Business (EAM Project)	Experience in UML Diagrams (mainly Activity Diagrams, Sequence Diagrams and State Machines) to understand the model based specification	Engineering for Autonomous Systems
105O	Thales	C++ Engineer-Transportation Business (EAM Project)	Strong understanding of Data Structures, Design Patterns, and Architectural Patterns;	Engineering for Autonomous Systems
105O	Thales	C++ Engineer-Transportation Business (EAM Project)	Knowledge in tools like Git, Jira	Engineering for Autonomous Systems

With the support of the Erasmus+ Programme of the European Union

No	Company name	Position	Requirements - Skills	Keyword
105O	Thales	C++ Engineer-Transportation Business (EAM Project)	Proficient in using UNIX, LINUX (bash, grep, find, etc.)	Engineering for Autonomous Systems
105O	Thales	C++ Engineer-Transportation Business (EAM Project)	Experience in Unit Test methodology	Engineering for Autonomous Systems
105O	Thales	C++ Engineer-Transportation Business (EAM Project)	Committed to the highest levels of quality.	Engineering for Autonomous Systems
105O	Thales	C++ Engineer-Transportation Business (EAM Project)	Intercultural communication, including the empathy to work in an international team;	Engineering for Autonomous Systems
105O	Thales	C++ Engineer-Transportation Business (EAM Project)	Team-working;	Engineering for Autonomous Systems
105O	Thales	C++ Engineer-Transportation Business (EAM Project)	Solution oriented while being open to embrace new technologies	Engineering for Autonomous Systems
105O	Thales	C++ Engineer-Transportation Business (EAM Project)	Flexibility and availability to travel abroad from time to time	Engineering for Autonomous Systems
105O	Thales	C++ Engineer-Transportation Business (EAM Project)	Proficient in spoken and written English	Engineering for Autonomous Systems
105O	Thales	C++ Engineer-Transportation Business (EAM Project)	You want your work to have a purpose	Engineering for Autonomous Systems
105O	Thales	C++ Engineer-Transportation Business (EAM Project)	You have an analytical thinking and a thirst for innovation	Engineering for Autonomous Systems

With the support of the Erasmus+ Programme of the European Union

No	Company name	Position	Requirements - Skills	Keyword
105O	Thales	C++ Engineer-Transportation Business (EAM Project)	You have creativity, originality and initiative	Engineering for Autonomous Systems
105O	Thales	C++ Engineer-Transportation Business (EAM Project)	You are resourceful and solution oriented	Engineering for Autonomous Systems
105O	Thales	C++ Engineer-Transportation Business (EAM Project)	You are able to adapt and react to change	Engineering for Autonomous Systems
105O	Thales	C++ Engineer-Transportation Business (EAM Project)	You are a team player but you also take ownership for your decisions	Engineering for Autonomous Systems
105O	Thales	C++ Engineer-Transportation Business (EAM Project)	You embrace autonomous and multicultural ways of working	Engineering for Autonomous Systems
105O	Thales	C++ Engineer-Transportation Business (EAM Project)	You are self-aware and you work on developing your leadership skills and social influence	Engineering for Autonomous Systems
105O	Thales	C++ Engineer-Transportation Business (EAM Project)	Finally, you like challenges and are willing to take part in the growth of the global engineering competence centre in Romania - you are the person we are looking for!	Engineering for Autonomous Systems
106O	Thales	SOC L3 security analyst	Expert in IBM QRadar administration and configuration ;	Engineering for Autonomous Systems
106O	Thales	SOC L3 security analyst	One professional certification : CISSP or CISA or CISM or CRISC or related GIAC certifications;	Engineering for Autonomous Systems
106O	Thales	SOC L3 security analyst	Experience with business-critical, complex, distributed systems ;	Engineering for Autonomous Systems
106O	Thales	SOC L3 security analyst	Customer-oriented ;	Engineering for Autonomous Systems

With the support of the Erasmus+ Programme of the European Union

No	Company name	Position	Requirements - Skills	Keyword
106O	Thales	SOC L3 security analyst	Autonomous, you are keen to take initiatives and make decisions ;	Engineering for Autonomous Systems
106O	Thales	SOC L3 security analyst	Team player, flexible and open to feedback ;	Engineering for Autonomous Systems
106O	Thales	SOC L3 security analyst	Curious, innovative and eager to learn;	Engineering for Autonomous Systems
106O	Thales	SOC L3 security analyst	English proficiency mandatory.	Engineering for Autonomous Systems
106O	Thales	SOC L3 security analyst	The solidity of a large Group ;	Engineering for Autonomous Systems
106O	Thales	SOC L3 security analyst	The agility of a human-sized structure ;	Engineering for Autonomous Systems
106O	Thales	SOC L3 security analyst	A company which at the forefront of innovation ;	Engineering for Autonomous Systems
106O	Thales	SOC L3 security analyst	An environment that fosters personnel development of all collaborators and offers opportunities for evolution within an international group ;	Engineering for Autonomous Systems

With the support of the Erasmus+ Programme of the European Union

List of skills obtained with the survey to the defence companies

Company	Job Title	Skill
ACMAT	Mechanical Designer (Ground Liaison) - (M / F) *	Design of suspension, steering or braking systems for special vehicles or for road vehicles
		CATIA V5 software
		Material shaping and hydraulic design
		Holder of a BTS or DUT in mechanical design (ex. BTS CPI), or a diploma of level Bac + 3 in mechanics, you justify a significant experience (5 years minimum) on a similar position .
	Electrical / Electronic Architecture Engineer (M / F)	Engineer training you have a minimum of 10 years of professional experience in a similar position.
		Very good knowledge of the physical architecture of a rolling vehicle and its main functions
		Mastery of on-board electrical architecture (<50 V) and electronics
		Knowledge of on-board wiring and harnesses (dimensioning, manufacturing, integration)
		Mastery of 3D CAD and design rules and tools (CATIA EHI) and 2D
		Notions of project management and taste for teamwork
		Great autonomy and good capacity for initiative
		You will manage suppliers and subcontractors and must therefore be a good communicator
		Good level of English required (equivalent to 750 in the TOEIC (B2) or 115 in the Linguaskills)

With the support of the Erasmus+ Programme of the European Union

Company	Job Title	Skill
	MIG / MAG welding robot technician	You hold a Bac + 2 training in Mechanical Engineering, Design and Realization in Industrial Boilermaking (CRCI), Design and Realization in Automated Systems (CRSA) or other similar training
		You have at least 2 years of professional experience in an equivalent position in an industry using robotic means (welding, handling, etc.).
		You have already driven fully autonomous robotic cells.
		You master the basic functions of Computer Aided Design (CAD) and more specifically CATIA V5.
		You are proficient in reading blueprints of details of complex parts and assemblies.
		You have bases in the mechanical field.
		You master one or more current PHL software compatible with the main robot manufacturers.
		Knowledge of MAG welding would be a plus
		You are dynamic, autonomous and know how to make decisions
		Your analytical mind, your strength of proposal and your ability to work in a team will be precious allies to succeed in this position.
		You will not use English regularly but you must understand it (especially in writing). A B2 / C1 level would be an additional asset for your application.
	Prototype Workshop Quality Manager (M / F)	mechanical knowledge related to the industrial vehicle (knowledge of the main vehicle components: engine, gearbox, brakes, steering ...)
		a mastered practice of PDCA dynamics (continuous improvement)
		a general knowledge of the main approaches to Supplier Quality and Customer Quality
		an ability to read plans, specifications, standards, and to analyze and write expert opinions, control reports, test reports , etc.

With the support of the Erasmus+ Programme of the European Union

Company	Job Title	Skill
	M / F Motor Integration Manager	General knowledge of Diesel engines, hybrid powertrains and in particular : accessories front, injection systems and turbomachinery; electric machines and batteries
		Knowledge of engine validation plans (bench or vehicle tests, endurance test, development)
		Ability to work in project mode, to ensure cross-functional management of activities, and to build and monitor budgets and their associated schedules.
	Alternating computer engineer - database developer (M / F)	• Project management
		• Application development
		• Mastery of Microsoft Access software
		• Mastery of databases
		• VBA programming
		• Knowledge of Teamplace / Sharepoint
	Industrial Logistics Manager (M / F)	You are a graduate of a bac + 2 / + 3 in logistics with at least 15 years of experience or of a bac + 5 type engineer diploma in logistics with 10 years of minimum experience
		You have a perfect knowledge of the supply chain and Lean management
		You have a first successful experience of change management in an industrial environment preferably
		You know how to set up processes, structure an activity and demonstrate strong adaptability
		Responsive, dynamic and customer-oriented, both internal and external, you will have to lead your department, be able to dialogue and communicate with the various contacts in the company.

Company	Job Title	Skill
		You have significant leadership and a unifying temperament that will allow you to effectively supervise your team
		You will use English on an ad hoc basis but as a member of the management committee, you must justify a level of English equivalent to 750 at the TOEIC, ie a level B2 / C1.
Aero Vodochody	Service technician for military aircraft	Secondary school in Aeronautical Mechanics / Avionics (with experience or graduate) with a high school diploma;
		or Secondary School of Electrical Engineering (with experience in the position of Aircraft Mechanic
		SOU branch Aircraft Repairer, etc.
	Aerostructures Assembly Director	• Experience in running a production/assembly facility while delivering above market standard and constant improvement and driving a culture where quality and efficiency is a top priority
		• Strong background in lean development and deployment e.g. Kanban, Kaizen, Six Sigma and Value Stream Mapping and other improvement processes with a track record of change management and driving lean into an operation;
		• Minimal financial knowledge to jointly with controlling, business development and other aerostructures units (e.g. design) run calculation for new production;
		• Ability to interface effectively with external and internal customers;
		• Risk management experience and proactive attitude toward risk mitigation and safety standards;
		• Fact-based problem solving;
		• Persistent in the face of difficulties.
	Aircraft mechanic	Secondary school in the field of aeronautical mechanic or aeronautical mechanic - avionics;
		willingness to learn new things.

With the support of the Erasmus+ Programme of the European Union

Company	Job Title	Skill
	Lean Manager	5 years of experience in production operations
		• conduct track record in Lean activity accomplishments.
		• Experience with leading the people
		• Fluent in Czech and English
		• Lean toolkit application skills (value stream mapping, 5S, Kaizen, SMED, Problem solving, etc.), KATA coaching experience as advantage
		• Project management
		• Change management
		• Business Financials & Performance
		• KATA coaching experience as advantage
Airbus Defence and Space	Software for test equipment	Educated to degree level (or equivalent) in Engineering.
		At least 2 - 3 years of experience in a similar role.
		English and Spanish must be negotiation level, both written and spoken.
		Mastering of TT Ethernet protocol
		Wide knowledge in programming sequences in UDMS
		Mastering of VHDL and programming languages (C, Csharp, Python)
		Knowledge of Visual Studio
		Linux OS knowledge
		Single-board computers or System on Chip (SoC) experience
		Use of MS Office
		Capability to work in group.
	Software Architect (d/f/m)	•You hold a university degree in computer science or equivalent qualification.
		•You consider yourself a Software architect with:
		Object-oriented analysis and design using UML

Company	Job Title	Skill
		Code programming skills in Java, C, Python
		GUI implementation for desktop applications with EMF and SWT
		You have a sound knowledge of development environments (e.g. Eclipse IDE, Git, Maven, SonarQube).
		Special knowledge in data model design and relational database (e.g. Oracle).
		•It would be an asset if you have experience in Electronic warfare and defensive aids systems
		•You are a good communicator with a proactive mindset and the ability to work in a team.
		•Agile software development processes and methods are not unfamiliar terms for you.
		•You are fluent in English, knowledge in German would be a plus.
	Solution Engineer (m/w/d)	You have successfully completed a degree in computer science or engineering (communications engineering, communication technology) .
		You have first professional experience in system engineering and have technical knowledge in the IT network area (e.g. router / firewall configurations, VLAN management, syslog management, DHCP & DNS, network monitoring, TCP / IP protocol).
		You have verifiable experience in the area of network management, e.g. CISCO CCNA certification.
		They act in a goal-oriented and systematic manner and tackle problems analytically.
		They are characterized by a high degree of personal responsibility and resilience, communication and presentation skills as well as cooperation and team skills.
		You also have very good knowledge of German and English.
	Cyber Security Architect (d/m/w)	Completed engineering / IT studies in the field of IT security, IT, or comparable
		• Extensive knowledge of cyber defense products, operating systems and network
		components • Substantial knowledge in development, implementation and validation, possibly in the operation of such solutions

With the support of the Erasmus+ Programme of the European Union

Company	Job Title	Skill
		• Long-term experience in implementation and application of recognized standards such as ISO 27001, NIST Cyber Security Framework, etc.
		• Structured and systematic approach to solving new, complex tasks and problems
		• Pronounced ability to work in a team
		• Experience in and in dealing with agile project teams
		• Many years of experience and knowledge of the market, the technological requirements and the relevant stakeholders in the area of cyber security
		• Ability to lead project
		teams professionally • Customer and service-oriented working methods
		• Experience in product and service development is an advantage
		• Experience in the management of research & Development projects an advantage
		• Excellent verbal and written communication skills
		• Business fluent in German and English
	Cyber Security Architect (d/m/w)	• Completed engineering / IT studies in the field of IT security, IT, or comparable
		• Extensive knowledge of cyber defense products, operating systems and network
		components • Substantial knowledge in development, implementation and validation, possibly in the operation of such solutions
		• Long-term experience in implementation and application of recognized standards such as ISO 27001, NIST Cyber Security Framework, etc.
		• Structured and systematic approach to solving new, complex tasks and problems
		• Pronounced ability to work in a team
		• Experience in and in dealing with agile project teams
		• Many years of experience and knowledge of the market, the technological requirements and the relevant stakeholders in the area of cyber security
		• Ability to lead project
		teams professionally • Customer and service-oriented working methods

Company	Job Title	Skill
		• Experience in product and service development is an advantage
		• Experience in the management of research & Development projects an advantage
		• Excellent verbal and written communication skills
		• Business fluent in German and English
	System engineer for laser communication terminals	Completed degree (aerospace, physics, electrical engineering, communications engineering)
		Extensive technical knowledge of current and future LCT products
		broad, interdisciplinary knowledge in electrical engineering, optics, mechanics
		Knowledge and experience in system engineering and requirements management
		broad experience in dealing with customers in development and flight programs
		Experience in managing development projects is desirable
		Knowledge of accommodation of payloads on satellites
		Resilience, flexibility, communication skills, organizational talent
		Proven ability to think analytically
	Security Coordinator	Proven track record in the delivery of safe, effective and value for money security operations within Commercial or UK Government, Military or MOD environments.
		Confident and articulate communication - You will be communicating with a wide range of security and non-security people
		An understanding of the UK Government & MOD rules and regulations
		Site Security and facilities management
		Good IT communication and inter-personnel skills
		Knowledge and experience in a corporate or related security environment.
		Any List X experience would be of interest, but not essential.
	Electronic card fitter & varnisher (m / f)	Bac pro, CAP, BEP (or equivalent) electrical and / or electronic training,
		A first experience as a card wiring technician,

Company	Job Title	Skill
		Good knowledge of wiring standards,
		Computer knowledge would be a real asset,
		Sense of communication and teamwork in a multi-business and international context,
		Spirit of synthesis, rigor, method, pragmatism, concern for the quality of work and transparency,
		Notions in English.
	Electronic equipment test manager (m / f)	Engineer in electronics or university training in related disciplines,
		¤ You justify at least 5 years of experience in electronics,
		¤ Experience in IT and programming,
		¤ You have a good team spirit,
		¤ Adaptability and rigor,
		¤ Willingness to interact with different areas of engineering (digital, analogy, etc.),
		¤ Ability to manage a team,
		¤ Space experience not necessary,
		¤ Level of negotiation in French and advanced in English.
	Confirmation Validation Integration Engineer (IVV) confirmed (m / f)	Knowledge in the field of instrumentation and / or the development of test means.
		Python and C language skills
		You are autonomous and have a sense of analysis.
		You have a good team spirit.
		Willingness to interact with different areas of engineering (digital, analog, etc.).
		Spatial experience not required.
		Language skills: Negotiation level in French and advanced in English.
	Electronic equipment fitter / integrator (m / f)	• Bac pro (or equivalent) training in mechanics, production.

Company	Job Title	Skill
		• A first experience as an assembler
		• Good knowledge of mechanical standards.
		• Computer knowledge would be a real asset.
		• Sense of communication and teamwork in a multi-business and international context.
		• Spirit of synthesis, rigor, method, pragmatism, concern for the quality of work and transparency.
		• Reading of plan,
		• Use of mechanical measuring devices (...).
		• Use of a binocular.
		• Knowledge of wired wiring.
		• Notions in collage techniques.
	IV&V test resources development engineer (m / f)	• Holds an engineering degree or equivalent in the field of electronics.
		• Experience of 3 to 5 years in a similar position is required,
		• Knowledge of the field of instrumentation and / or the development of test means is required,
		• Skills in analog and power electronics are required
		• Python and C language skills would be appreciated,
		. Experience in space would be a plus,
		• You have a good capacity for adaptation, are autonomous, rigorous, and have a sense of analysis,
		. You have a good team spirit,
		. You have provisions to interact with different fields of engineering (digital, analog, ...),
		• Language skills: Negotiation level in French and advanced in English.
	Electronic card controller (m / f)	• Bac pro (or equivalent) training in electrical and / or electronics.

Company	Job Title	Skill
		• A first experience as a wiring controller for electronic cards.
		• Good knowledge of wiring standards.
		• Computer knowledge would be a real asset.
		• Sense of communication and teamwork in a multi-business and international context.
		• Spirit of synthesis, rigor, method, pragmatism, concern for the quality of work and transparency.
		• Reading of plan, layout diagram
		• Use of electrical measuring devices (multimeter, ...).
		• Use of a binocular.
		• Knowledge of wired wiring.
		• Notions in collage techniques.
		• Knowledge of brazing techniques.
		• Notions of English.
	Technical Manager of a Logistics Information System (m / f)	• Holder of an engineering degree or equivalent training
		• Project management experience of at least 5 years
		• Experience as a technical project manager of at least 5 years
		• Mastery of support activities for the Project Manager
		• Knowledge of group facilitation technique and comfortable leading a technical team
		• IT knowledge recommended: Windows 2016, Active Directory, GPO, WSUS
		• Security knowledge recommended: Authentication, certificate management, antivirus, firewall
		• Recommended network knowledge: router, switch, network layers, tunneling, different protocols and equipment manufacturers
		• Recommended management and supervision knowledge: inventory, network and IT equipment supervision, dashboards with different tools (WhatsUp Gold, Centreon , Zabbix ...)
		• Knowledge of Recommended Databases: SQL Server

Company	Job Title	Skill
		• Good communication to defend technical choices in front of the client
		• Editorial quality
		• You have experience with the JIRA tool, You are autonomous, rigorous, methodical and a taste for teamwork
		• You are reactive and know how to adapt
		• Language skills: Intermediate level in English and fluent in French
	Aero Service System Design Manager (m/f)	• Strong Technical Background in Satellite Telecommunication
		• Strong Project Management background especially in industrial roll-out
		• Large autonomy
		• Excellent knowledge of Satellite Operator Business
		• Strong understanding of customer and satellite services market dynamics and requirements
		• Very good communication skills, highly-international environment
		• Minimum 10 year experience in SAtCom environment
		• Fluent English
	IT-Systemadministrator (m/w/d)	Completed degree or comparable vocational training with relevant professional experience
		Sound knowledge of Linux and Windows administration
		Solid knowledge of network technology
		Experience in automation with scripting languages such as Ansible, Bash and Windows Powershell
		Customer and service-oriented way of working
		Proficient in German and English
		Experience in log management, SIEM, IDS / IPS or malware protection is desirable
	Validation engineer (m / f / d)	You have successfully completed a degree in electrical engineering, communications engineering or computer science.

With the support of the Erasmus+ Programme of the European Union

Company	Job Title	Skill
		You have a good knowledge of one or more system technologies (e.g. LTE, GSM, TETRA) as well as verification and validation procedures.
		You have practical experience in creating test cases and know the appropriate methods and tools.
		You are sure to use the latest measurement and diagnostic tools and have already worked with requirements management and test tools (e.g. DOORS, scripting, test automation).
		You are characterized by your independent organization, quality-conscious work, analytical approach and your ability to work in a team.
		You have very good knowledge of German and English.
	System Information Engineer	Completed studies as a graduate engineer or MA (university, college) electrical engineering, telecommunications, information technology or comparable training
		Affinity for systems engineering - in the design and architecture of communication networks
		Knowledge in the field of information technology, possibly satellite communication or radio transmission
		Knowledge of operating systems (Windows, Linux)
		Knowledge of IT security skills (e.g. encryption, VPN)
		Experience in designing and analyzing IT systems in the SATCOM network
		Team player in a multifunctional team
	Cyber Defense Architect (SOC) (m / f)	Log Management System,
		SIEM,
		Intrusion detection systems (NIDS, NIPS, HIDS),
		Security of LAN, MAN, WAN networks (dynamic routing, ddos, ISPEC VPN, firewall, nests, etc.),

Company	Job Title	Skill
		Linux / Unix Operating System,
		System engineering skills (requirements management, V cycle, waterfall, functional analysis, etc.),
		Knowledge of security standards and regulations (ISO27xxx, common criteria, CSPN, RGS, defense regulations, PDIS, PRIS, etc.).
		UBA / UEBA analytics solutions
		Malware detection systems (sandboxing)
		EDR systems
		Advanced network analysis systems (DPI / FPC, NBA)
		Windows Operating System
		Endpoint security (antivirus, device control, integrity, hids, mobile fleet, etc.)
		Identity security (strong authentication, access control, directory, etc.)
		PKI (HSM, enrollment authority, smart card, PC, DPC, etc.)
	Radiation and Nuclear Hardening Engineer	Genuine interest in working in the space industry and in the field of radiation/nuclear hardening of spacecraft and equipment
		Desire to complete tasks in line with project requirements, to budget and within agreed timescales
		Gravitas in communicating with customers and suppliers
		Knowledge of radiation effects on components
		Experience in analysis of radiation and nuclear hardening data
		A willingness to travel overseas
		Hold or ability to obtain the required Security Clearance for this role
	Cyber Security Incident Handler & Forensics (d/m/f)	A technical degree in computer science or similar field;
		Extensive experience in incident response;
		Familiar with forensics software such as EnCase, Helix, XRY and FTK;

Company	Job Title	Skill
		Comfortable with archiving and backing up a variety of technologies;
		Fluent in major programming languages such as Java, PHP, C++, C, C# and ASM;
		Highly proficient in computer operating systems like Linux, UNIX and Windows;
		Good understanding of Internet-based application security;
		Quick thinking, confident in making decisions in high pressure situations, willing to adapt in emergency situations, great problem solving skills, logical and rational thinker, patient, good communication skills (in writing and spoken);
		English and German: negotiation level.
	ALT 2020 - Apprentice Developer of mechanical and thermal simulation tools (m / f)	Software development (procedural, object oriented, etc.),
		Experience in code optimization (parallelization ...),
		Experience in the development of user interfaces,
		Knowledge of languages and Technologies: Python, C ++, C #, Web applications, Unity, user interface styles…
		Experience with the physical open source gaming environment,
		Experience in 3D environment and rendering (3D mosaic / math models, ray tracing),
		Good understanding of the mechanical and thermal design environment (FEM, finite difference),
		Intermediate level in English,
		- Rigorous, curious and autonomous,
		- Endowed with a relational sense and good communication skills,
		- Ability to integrate into a team and adaptability,
		- Recognized for your organizational qualities,
		- Ability to analyze and synthesize.

With the support of the Erasmus+ Programme of the European Union

Company	Job Title	Skill
	Cyber Security Teamleiter OT Security (d/m/w)	- Completed engineering or computer science degree in the field of computer science, mechanical engineering, electrical engineering or comparable several years of professional experience in a similar position
		- leadership experience
		- Knowledge and experience in the implementation of the most common IT / OT or ICS (Industrial Control System) security measures, e.g. firewalling, endpoint protection, sandboxing and in particular security monitoring and security operation center
		- Knowledge of the most important relevant standards (e.g. IEC 62443, ISO 27K, BSI IT-GS)
		- Pronounced initiative, service and service orientation and assertiveness
		- Structured and organized way of working
		- Excellent verbal and written communication skills
		- Proficient in German and English
	Solution Engineer (m/w/d) AGNET	You have successfully completed a university degree in a technical area, preferably electrical engineering, communications engineering or computer science.
		You have knowledge of 4G / 5G cellular networks and / or cloud architectures (on-premesis, SaaS, private & public cloud), cloud provision (AWS, Azure, OVH).
		Knowledge of network management tools, IP networking (routing / switching), central services such as DNS, DHCP, NTP etc. and IT security architectures are an advantage.
		You think analytically, goal-oriented and have the ability to tackle complex tasks and problems independently, flexibly and strategically
		They are characterized by a high degree of personal responsibility and resilience, communication and presentation skills as well as cooperation and team skills.

With the support of the Erasmus+ Programme of the European Union

Company	Job Title	Skill
		You have very good knowledge of German and English.
	Solution Architect (m/w/d) AGNET Mission Critical Communication	You have successfully completed a university degree in a technical area, preferably electrical engineering, communications engineering or computer science.
		You already have solid professional experience in developing system concepts for the relevant specialist area.
		You have knowledge in the areas of cloud architectures (on-premesis, SaaS, private & public cloud), cloud provision (AWS, Azure, OVH) and IT security architectures.
		You think analytically, goal-oriented and have the ability to independently tackle complex tasks and problems flexibly and strategically in order to develop efficient solution concepts
		They are characterized by their strong customer orientation, - communication, - presentation, - team, - and cooperation skills
		You have very good knowledge of German and English.
	Solution Designer (m / f / d) AGNET LTE Core	You have successfully completed a university degree in a technical area, preferably electrical engineering, communications engineering or computer science.
		You have professional experience in the development of system concepts for the relevant specialist area.
		You have experience with LTE core network (ePC components, PCRF, eMBMS, Mission Critical Services according to 3GPP) and smartphones & accessories.
		Knowledge / experience of cloud architectures (on-premesis, SaaS, private & public cloud), cloud provision (AWS, Azure, OVH) and IT security architectures are an advantage.

Company	Job Title	Skill
		You think analytically, goal-oriented and have the ability to tackle complex tasks and problems independently, flexibly and strategically
		They are characterized by a high degree of personal responsibility and resilience, communication and presentation skills as well as cooperation and team skills.
		You have very good knowledge of German and English.
	ALT 2020 - Software development simulation infrastructure (m / f)	- A first experience in software development,
		- A keen interest in the Space Professions,
		- An intermediate level in English.
		You have the following skills:
		- Rigorous, curious and autonomous,
		- Endowed with a relational sense and good communication skills,
		- Ability to integrate into a team and adaptability,
		- Recognized for your organizational qualities,
		- Ability to analyze and synthesize, team spirit,
		- Knowledge of project management would be a plus.
		At the end of the learning cycle, you will have acquired skills in the following areas:
		Object-oriented design, Model-driven engineering,
		Technologies: C ++, Java, Eclipse, RCP, EMF, Git, Python, JUnit, Maven…,
		Development methodology,
		Operational and technical documentation,
		Communication: technical presentations in English,
		Industrial software development process,
		Airbus Defense & Space working methods,
		Space trades.
	Security Incident Handler for Business Owned Tools	- Educated to a degree level in Information Technology or equivalent

With the support of the Erasmus+ Programme of the European Union

Company	Job Title	Skill
		- Visible experience in Information Security and / or Information Technology.
		- Ability to work in an environment that requires a high level of detail and confidentiality.
		- Self-motivated with the ability to work independently and as a team member in a challenging environment.
		- Excellent communication and interpersonal skills.
		- Solid understanding of the Security Incident Response process.
		- Having principle Project Management capabilities organizing different projects and coordinating various tasks at the same time.
		- Deep network/communications protocols and operating system knowledge.
		- Technical Knowledge about common security tools like FireEye, IDS, AV & Splunk
		- Forensic capabilities using FTK for example are desirable.
		- Negotiation level in English, both written and verbal.
	Front-End Software Developer	- UI/Javascript frameworks (e.g. Angular, React)
		- JavaScript, HTML5 and CSS3
		- User Experience concepts (e.g. intuiative, efficient)
		- Single Page Applications
		- Responsive web design to support a variety of devices
		- Work with wireframes/mock-ups
		- Experience of coding to RESTful interfaces
		- CI/CD delivery techniques
		- Issue tracking systems (such as Jira)
	Firmware Engineer	- Comfortable designing, implementing and documenting Firmware to customer needs

Company	Job Title	Skill
		- Working knowledge of Xilinx FPGA technologies (including Vivado) and VHDL design lifecycle
		- Some experience with Matlab, Simulink of SysML or UML
	Experienced RF Engineer	Antenna simulation tools: TICRA software
		Good Analytical and mathematical skills
		Experience in antenna designs and either antenna theory or microwave / RF (Radio Frequency) engineering.
		Microwave design experience with phased arrays and other active antennas, based on horn and printed radiating elements
		Experience utilizing electromagnetic simulation tools such as FEKO, CST or similar analysis software.
		Experience with MATLAB analysis and basic programming.
		Experience in designing antenna feeds.
		Experience in passive antenna design (Single offset, Gregorian, Single Feed Per Beam (SFPB), multiple feed per beam (MFPB)…)
		French language is a plus but not Mandatory.
	Security Operations Apprentice (m / f)	You will integrate training at a BAC + 4 or BAC + 5 level in the field of information systems or IT security for a 2 to 3 year apprenticeship.
		You have the following knowledge and skills:
		¤ IT experience (PC, Office, Windows ...),
		¤ knowledge in IT security (ISO 27001, patch management, compliance management, remediation, certificates),
		¤ autonomy, initiative, teamwork, curiosity,
		¤ knowledge in software distribution would be a plus.
	Solution Architect - Splunk	Experience working with system and network architectures

With the support of the Erasmus+ Programme of the European Union

Company	Job Title	Skill
		A good working knowledge of Splunk Technology - it'd be great if you're a Splunk expert, but we'd still love to hear from you if you're not!
		An understanding of project management
	Cyber Security Engineer (d / m / f)	• Completed engineering / IT studies in the field of IT security, IT, or comparable knowledge of cyber defense products, operating systems and network components
		• Extensive knowledge in development, implementation and validation, possibly in the operation of such solutions
		• Experience in the implementation and application of recognized standards, such as ISO 27001, NIST Cyber Security Framework, etc.
		• Structured and systematic approach to solving new, complex tasks and problems
		• Pronounced ability to work in a team
		• Experience in and in dealing with agile project teams
		• Experience and knowledge of the market, the technological requirements and the relevant stakeholders in the area of cyber security
		• Customer and service-oriented way of working
		• Experience in product and service development is an advantage
		• Experience in the management of research and development projects is an advantage.
		• Excellent communication skills in spoken and written
	Cyber System Engineer	You will possess a fundamental understanding of the Systems Engineering process, coupled with experience of applying your skills within a complex technical environment.
		You will be able to demonstrate knowledge and application of contemporary Systems Engineering practices and methods and have the ability to apply relevant Systems Engineering methodologies and toolsets.
		Being able to apply 'Systems Thinking' to problems at a technical, project or enterprise level is highly desirable.

Company	Job Title	Skill
		INCOSE – ASEP/CSEP/ESEP Certification would be desirable
		Ideally suited to a Software Engineering background preferably within C# or C+ expertise.
	Test Controller	Systems engineer with a broad based communications and information systems background, including the configuration, operation and testing of Combat Net Radio (CNR) systems
		Testing experience including a detailed knowledge of Commercial off the Shelf (COTS) network emulation, stimulation and monitoring tools
		Understanding of the protocols used in military communications, CNR and information systems
		Experienced in the operation of network testing tools for monitoring, stimulation, emulation and analysis
		Experience in testing military CIS systems or applications would be advantageous
		Effective leadership of a small team of engineers to produce reproducible test environment
		Demonstrable detailed knowledge of configuration control practice and hands on equipment husbandry
		Expert knowledge of Microsoft Windows and Microsoft Office products including Word, Excel and Visio
		Communications or information systems engineering degree/HND or equivalent experience
		CCNA/CCNP level knowledge.
	Payload Optical Architect	Degree in relevant degree such as Engineering or Physics/Engineering or related field
		Experience in hardware development
		Excellent written and verbal communication skills

Company	Job Title	Skill
		Able to work in a multi-disciplinary systems environment
		Good customer facing skills including presentation skills
		A good understanding of optical design, analyses methods and optical tolerances
		Knowledge of fabrication and testing techniques for optical components and systems
		Experience with relevant optical coatings and materials for the space environment - Desirable
		Demonstrable optical analysis, design and development
		Systems Engineering - Desirable
		Subcontract technical management - Desirable
		ESA project experience; Matlab; CodeV/Zemax; ASAP/FRED; DOORS;Knowledge of ISO Optical Design and ECSS standards - Desirable
	DSP (Digital Signal Processing) Engineer	• Degree level in Electrical or Electronic Engineering.
		• Proven track record of successful high speed DSP design and firmware development targeting advanced Xilinx FPGAs or similar, and integration of complex FPGAs and digital boards.
		• Experience in use of Mentor graphics tools including Signal & Power Integrity analysis,
		• Ability to work in a multi-disciplinary systems engineering environment.
		• Ability to communicate effectively in oral and in written form, for presentation internally and to customers.
	National Cloud Service Delivery Manager (d/f/m)	Extensive experience in IT outsourcing / cloud projects;
		Ability to work in a fast-paced, ever changing start up environment;
		Several years of experience in managing large suppliers and contracts;
		Multi-year experience in a Cloud-related operations is a plus (Cloud Provider, Telco, Search Engine, Social Network, ...);
		Experience in defining and implementing reporting systems, optimally also experience with implementation of reporting regimes and monitoring solutions;

Company	Job Title	Skill
		Technical understanding of Cloud, IoT, and Big Data platforms is a plus (i.e. Thingworx, Hortonworks, Azure, AWS);
		Experience operating in a hybrid environment of cloud/platform services (IaaS, PaaS, SaaS / based on i.e. Azure, AWS, GCP, OpenStack, OpenShift) is a plus;
		Experience in working in an ITIL environment is a must, ITIL certification is a major plus;
		Solid communication and interpersonal skills are a must;
		Security clearance
		Languages: English at Negotiation Level, additional languages (i.e. French, German, Spanish, Italian) are a plus
	IM Technical Service Delivery Manager	Experience in IT/IS service management and ability to lead and organize IT/IS support activities
		Knowledge in the most important technologies used (Oracle stuck (DBA, SOA, Fusion Middleware, UNIX, Windows)) and best practices to manage services (i.e. ITIL)
		Analytical skills with capabilities for problems solving, debugging, etc. Technical background is expected
		Team player with strong change and expectation management skills and the ability to work in an agile environment close with key business stakeholders
		Profound communication and interpersonal skills with strong customer and company focus following the hierarchy. Good reporting skills.
		Confidence, patience, politeness, tact and diplomacy, when dealing with difficult situations
		Motivational skills and an ability to supervise and lead a team
		Creative thinking, to be able to come up with new ideas to improve customer service standards

Company	Job Title	Skill
		An ability to work well under pressure
		Organisational and planning skills
		A negotiation level in English is mandatory
		ITIL Certificate is a plus
	Cyber security operator (d / m / f)	- Completed vocational training in the field of information technology or similar
		- High level of interest in information security techniques
		- Very good ability for service-oriented communication
		- Structured and precise way of working
		- Independent work and willingness to learn
		- Very good ability to work in a team in an international work environment
		- Fluent in German and English
	Satellite Digital Electronic Lead Hardware Engineer	Experience managing a small team, including management of work packages and headcount requirements.
		Excellent team-working, decision-making skills and analytical skills required.
		Proven ability to provide sufficient detailed data and information about system elements to enable consistent hardware implementation in accordance with the allocated requirements.
		The demonstrated ability to master the design and/or perform analysis of digital electronic circuits using the latest digital design tools, including the design of printed circuit boards, logic circuits, schematic capture, signal integrity, timing analysis, worst case analysis, and environmental constraints.
		Knowledge of test and measurement techniques for digital circuits.
		Experience in verifying the compliance of a detailed design solution toward baseline of validated requirements.

With the support of the Erasmus+ Programme of the European Union

Company	Job Title	Skill
	Cyber Test Engineer (Verification & Validation)	Must have experience of formal Verification and Validation of complex electronic equipment and/or supporting software applications
		Familiar with test and integration methods for software and hardware product development
		Able to carry out Verification and Validation tasks of up to three months duration with only limited supervision
		TCP/IP network configuration and test
		Cryptographic Key Management and Distribution Systems
		Secure Communications Systems
		Secure Cryptographic Communications Network Devices
		Experience and working knowledge of some or all of the following:
		Automated Test Experience
		Integration/test of database systems (e.g. Oracle/SQL)
		Test script/software development (Windows and Unix environments)
		Black box software testing
		EMC, Safety, Environmental, TEMPEST qualification testing
		ISTQB Software Test qualified to at least Foundation Certificate standard
		CCNA standard experience and working knowledge of network configuration and operation
	Senior hardware Engineer - Cyber Security	Educated to Degree level (or equivalent) in Electronic Engineering.
		Must have an extensive experience of digital design and implementation for data/voice communications equipment or equivalent using high speed microprocessor, memory, FPGA and CPLD components.
		Must have proven capability to design high-speed electronic equipment that is CE compliant with EMC, Safety and RoHS criteria.

With the support of the Erasmus+ Programme of the European Union

Company	Job Title	Skill
		Must have excellent electronics hardware development knowledge.
		Able to carry-out development tasks of up to six months duration with very limited supervision.
		Must be familiar with high speed digital design standards and techniques.
		Must have a good understanding of requirements capture and of work package definition and estimation.
		Experience of electronics hardware development to meet UK approved TEMPEST design criteria.
		Experience of schematic capture.
		Experience of PCB layout.
		Experience of thermal analysis for electronic circuits.
		Recent experience of using one or more of the following tools:
		OrCAD Capture
		OrCAD PCB Designer

With the support of the Erasmus+ Programme of the European Union

Filtered list of skills in the field

Skill	Source	Field	ESCO	Score (Occurences)
Ability to **model an AI problem**	Questionnaire	AI	NA	12
Expertise in **machine learning** algorithms	Questionnaire	AI	NA	28
Expertise in **machine learning** tools (**tensorflow, opencv**)	Questionnaire	AI	- utilise machine learning	12
Ability to **operate and program robotics solutions** for production processes	Questionnaire	Robotics	- robotics	15
Ability to translate an industrial process into **integrated digital solutions**	Questionnaire	Robotics	- problem-solving with digital tools	1
Ability to translate promising Proof of Concept projects into **large-scale and usable applications**	Questionnaire	AI, Roborics, AS	NA	1
Ability to program and **solve minor technical problems in robots**	Questionnaire	Robotics	NA	1
Knowledge about **system interoperability**	Questionnaire	AI, Roborics, AS	NA	1
Expertise in Model Based System Engineering	Questionnaire	AI, Roborics, AS	NA	4
Knowledge of **multi-sensor architectures**	Questionnaire	Robotics, AS	- sensors	2
Knowledge of **networking and communication systems**	Questionnaire	Robotics, AS	- telecommunications engineering - design computer network	58
Knowledge of **sensor design**	Questionnaire	Robotics, AS	- design sensors	21
Expertise in **additive manufacturing**	Questionnaire	Robotics	- 3D printing process	1
Expertise in **automation**	Questionnaire	AI, Robotics, AS	- automation technology	10
Knowledge of **digitalisation and information technologies**	Questionnaire	AI, Robotics, AS	- information and communication technologies (icts)	6

With the support of the Erasmus+ Programme of the European Union

Skill	Source	Field	ESCO	Score (Occurences)
Software modeling and engineering (UML, agile, unit testing)	Job postings	AI, Robotics, AS	- software architecture models - Agile development	20
Advances skills in **programming (python, C, C++, R, Java, MATLAB, boost, git, docker)**	Job postings	AI, Robotics, AS	- programming computer systems	18
Expertise in **human-machine interfaces and interaction, UI design**	Job postings	Robotics, AS	- design user interface - design component interfaces	5
Expertise in **sensors and actuators**	Job postings	Robotics, AS	- sensors	11
Expertise in **computer vision and image processing**	Job postings	AI, Robotics, AS	- analyse images	16
Expertise in **data mining and big data**	Job postings	AI, Robotics, AS	- analyse big data - data mining methods	13
Expertise in **distributed systems**	Job postings	Robotics, AS	- distributed computing	9
Expertise in software for **safety critical applications**	Job postings	AI, Robotics, AS	- operate vessel critical systems	10
Experience with **embedded systems**	Job postings	Robotics, AS	- embedded systems	12
Knowledge of **power systems**	Job postings	Robotics, AS	- design electric power systems	6
Knowledge of **diesel engines**	Job postings	Robotics, AS	NA	2
Proficiency in using **LINUX/UNIX**	Job postings	Robotics, AS	- Kali Linux	18

Appendix 4: Skills of the C4ISTAR domain

This appendix contains the full list of skills extracted in the C4ISTAR domain. The appendix is structured as following: (1) the technical skills related to the C4ISTAR domain; (2) the transversal skills identified; (3) the defence-related skills in the C4ISTAR field. Table 4 shows for each type of skills the number of items identified in the C4ISTAR domain and the number of the selected skills using the selection criteria described in the document R1.1 “Strategy Specification”.

Skill	Number of identified skills	Number of selected skills
Technical skill	260	40
Transversal skill	860	10
Defence-related skill	442	8

Table 13 - Number of extracted entities and selected skills for each type of skill.

Technical skills

The technical skills are identified using the technologies and the applications of the C4ISTAR field mapped in the task T 2.1 of the ASSETs+ projects. The methodology for mapping the technical skills is described in detail in the Appendix 2 “C4ISTAR technologies and applications on ESCO”. Table 5 shows the list of technical skills for each pair of technology-application with the relevance score for the C4ISTAR domain, extracted from the relevance matrix of T 2.1 task of project. For each skill the table reports the definition of the skill and the classification of the ESCO in skill/competence or knowledge.

The list of the technical skills collected in the table 5 is manually parsed to analyse the relevance for the C4ISTAR domain and various filtering process are applied as described in paragraph 2.2 “Identify skills”.

With the support of the Erasmus+ Programme of the European Union

Skill	Technology	Application	Relevance	Description	Type
Ruby (computer programming)	aerial	communication	9	The techniques and principles of software development, such as analysis, algorithms, coding, testing and compiling of programming paradigms in Ruby.	knowledge
Apache Maven	aerial	communication	8	The tool Apache Maven is a software program to perform configuration identification, control, status accounting and audit of software during its development and maintenance.	knowledge
develop data link services for navigation purposes	aerial	data analysis	9	Develop and implement data link services and satellite technologies for air-ground communication operations.	skill/competence
Visual Studio .NET	aerial	data processing	9	The techniques and principles of software development, such as analysis, algorithms, coding, testing and compiling of programming paradigms in Visual Basic.	knowledge
coordinate technical standards for global interoperability	aerial	identification	8	Ensure cooperation between various stakeholders in order to achieve standardisation of technical and operational aspects of surveillance systems.	skill/competence
use radar navigation	aerial	logistic	7	Operate modern radar navigation equipment to ensure safe vessel operations.	skill/competence
Java (computer programming)	aerial	monitoring	9	The techniques and principles of software development, such as analysis, algorithms, coding, testing and compiling of programming paradigms in Java.	knowledge
administer ICT system	aerial	planning	9	Handle components of ICT system by maintaining configuration, managing users, monitoring resource use, performing backups and installing hardware or software to comply with the set requirements.	skill/competence
airport planning	aerial	programming	8	Know airport planning for different types of aircrafts; use that information to mobilise resources and people in order to handle the aircrafts while they are in the airport.	knowledge
use a complex communication system	antennas	remote control	10	Install and operate complex communication systems.	skill/competence
use water navigation devices	artificial intelligence	programming	7	Utilise water navigation devices, e.g. compass or sextant, or navigational aids such as lighthouses or buoys, radar, satellite, and	skill/competence

Skill	Technology	Application	Relevance	Description	Type
				computer systems, in order to navigate vessels on waterways. Work with recent charts/maps, notices, and publications in order to determine the precise position of a vessel.	
use water navigation devices	big data	data analysis	8	Utilise water navigation devices, e.g. compass or sextant, or navigational aids such as lighthouses or buoys, radar, satellite, and computer systems, in order to navigate vessels on waterways. Work with recent charts/maps, notices, and publications in order to determine the precise position of a vessel.	skill/competence
design process	cameras	imagery	10	Identify the workflow and resource requirements for a particular process, using a variety of tools such as process simulation software, flowcharting and scale models.	skill/competence
operate radio navigation instruments	cameras	logistic	8	Operate radio navigation instruments to determine the position of aircraft in the airspace.	skill/competence
cued speech	cameras	remote control	10	The visual communication system that makes use of handshapes and mouth movements to differentiate between the phonemes of spoken language. It is used to help individuals with hearing or language difficulties to visually perceive the fundamental properties of a language.	knowledge
operate port communications systems	cameras	surveillance	9	Operate telephone and radio systems, and more complex communication systems used in inland waterway ports, in the coordination of port operations.	skill/competence
operate port communications systems	cameras	surveillance	10	Operate telephone and radio systems, and more complex communication systems used in inland waterway ports, in the coordination of port operations.	skill/competence
operate concrete pumps	communications systems	communication	7	Operate the remote control of the robotic arm of a concrete pump while monitoring the pouring process.	skill/competence
operate concrete pumps	communications systems	communication	7	Operate the remote control of the robotic arm of a concrete pump while monitoring the pouring process.	skill/competence
prepare travel packages	communications systems	communication	7	Make holiday and travel packages ready and arrange accommodation, logistics and transportation services such as	skill/competence

Skill	Technology	Application	Relevance	Description	Type
				chartered airplanes, taxis or rental cars for clients and additional services and excursions.	
geographic information systems	communications systems	communication	7	The tools involved in geographical mapping and positioning, such as GPS (global positioning systems), GIS (geographical information systems), and RS (remote sensing).	knowledge
maintain internal communication systems	communications systems	communication	10	Maintain an effective internal communication system among employees and department managers.	skill/competence
JavaScript	communications systems	communication	9	The techniques and principles of software development, such as analysis, algorithms, coding, testing and compiling of programming paradigms in JavaScript.	knowledge
Perl	communications systems	communication	9	The techniques and principles of software development, such as analysis, algorithms, coding, testing and compiling of programming paradigms in Perl.	knowledge
follow-up actions resulting from railway facilities inspections	communications systems	communication	8	Follow-up actions resulting from inspection into railway facilities and the identification of malfunctions or discrepancies in station platforms, vending machines, station kiosks, railway vehicles, and other railroad facilities.	skill/competence
PHP	communications systems	communication	9	The techniques and principles of software development, such as analysis, algorithms, coding, testing and compiling of programming paradigms in PHP.	knowledge
operate stowage programmes	communications systems	communication	8	Operate stowage programmes used for controlling stability in vessels, loading operations, and cargo planning processes. Interpret graphical interfaces, stowage data and scenario variables.	skill/competence
C#	communications systems	communication	9	The techniques and principles of software development, such as analysis, algorithms, coding, testing and compiling of programming paradigms in C#.	knowledge
plan space satellite missions	communications systems	communication	8	Plan missions to either launch, release, or capture satellites in orbit. Plan launch windows for each one of these activities and the steps required for a successful mission, such as preparation of launch sites, and agreements with launch partners.	skill/competence

With the support of the Erasmus+ Programme of the European Union

Skill	Technology	Application	Relevance	Description	Type
handle geospatial technologies	communications systems	communication	7	Can use Geospatial Technologies which involve GPS (global positioning systems), GIS (geographical information systems), and RS (remote sensing) in the daily work.	skill/competence
use software tools for site modelling	communications systems	communication	10	Use software and other modelling tools to create simulations of and develop scenarios for possible outcomes of site operations. Use the information gathered from simulations and models for analysis and decision making.	skill/competence
use software tools for site modelling	communications systems	communication	8	Use software and other modelling tools to create simulations of and develop scenarios for possible outcomes of site operations. Use the information gathered from simulations and models for analysis and decision making.	skill/competence
ASP.NET	communications systems	communication	9	The techniques and principles of software development, such as analysis, algorithms, coding, testing and compiling of programming paradigms in ASP.NET.	knowledge
use remote control equipment	communications systems	communication	7	Use a remote control to operate equipment. Watch the equipment closely while operating, and use any sensors or cameras to guide your actions.	skill/competence
use remote control equipment	communications systems	communication	6	Use a remote control to operate equipment. Watch the equipment closely while operating, and use any sensors or cameras to guide your actions.	skill/competence
install rock movement monitoring devices	communications systems	navigation	8	Install and operate monitoring devices, such as extensometers to measure deformation and movement, pressure cells to measure stresses and geophones to measure microseismicity.	skill/competence
use production planning software	communications systems	surveillance	9	Use software that facilitates planning and scheduling in the manufacturing industry and enables the optimisation of resource allocation.	skill/competence
perform small vessel navigation	data analytics	data analysis	7	Perform navigation of the vessel. Keep up to date nautical publications for safe navigation. Determine the vessel's position and trace the tracks properly to ensure safety. Perform safe navigation, complying with regulations so as to avoid collisions, groundings, beaching and prevent marine pollution. Interpret	skill/competence

Skill	Technology	Application	Relevance	Description	Type
				weather reports using data obtained or provided to ensure the safety of the vessel. Apply radar information. Manage communications following maritime protocols.	
perform small vessel navigation	data analytics	data analysis	8	Perform navigation of the vessel. Keep up to date nautical publications for safe navigation. Determine the vessel's position and trace the tracks properly to ensure safety. Perform safe navigation, complying with regulations so as to avoid collisions, groundings, beaching and prevent marine pollution. Interpret weather reports using data obtained or provided to ensure the safety of the vessel. Apply radar information. Manage communications following maritime protocols.	skill/competence
communication sciences	data analytics	data analysis	10	The practice and theory of communication systems, mass media, journalistic practices, and persuasive communication. It also includes the empirical methods utilized by communication scientists to acquire data such as interviews, surveys, and focus groups.	knowledge
use access control software	data analytics	data analysis	7	Utilise software to define the roles and manage user authentication, privileges and access rights to ICT systems, data and services.	skill/competence
operate railway freight monitoring technologies	data analytics	data analysis	8	Operate monitoring and inspection technologies that can be used to check crucial parameters of freight transportation conditions or vehicle-track systems. Identify and warn of the potential threats posed by the freight, the route, and the train.	skill/competence
study community as a target community	data analytics	data analysis	10	Employ appropriate research activities to find out about this specific community as potential/target market. Identify their specific needs, the dance style, roles and relationships and communication systems employed previously to cover these needs. Research the importance of values, policies or language that are relevant to communicating with them.	skill/competence
manage office facility systems	data analytics	data analysis	10	Keep management and serviceability of the various office systems needed for the smooth and daily operation of the office facilities	skill/competence

Skill	Technology	Application	Relevance	Description	Type
				such as internal communication systems, softwares of common use inside the company, and office networks.	
manage office facility systems	data analytics	data analysis	9	Keep management and serviceability of the various office systems needed for the smooth and daily operation of the office facilities such as internal communication systems, softwares of common use inside the company, and office networks.	skill/competence
solve location and navigation problems by using GPS tools	data analytics	data analysis	8	Use applications and devices which provide users with accurate assessment of their location using system of satellites, such as navigation systems.	skill/competence
transmission technology	data analytics	data analysis	9	Technologies that allow the transmission of analogue or digital information signals over a point-to-point or a point-to-multipoint through the use of communication channels or transmission media, such as optical fibre, copper wire, or wireless communication channels. The information or data are usually transmitted as an electromagnetic signal, such as radio waves or microwaves.	knowledge
relay messages through radio and telephone systems	data analytics	data analysis	9	Possess the communication abilities to relay messages through a radio and telephone system.	skill/competence
ICT security legislation	data analytics	data analysis	7	The set of legislative rules that safeguards information technology, ICT networks and computer systems and legal consequences which result from their misuse. Regulated measures include firewalls, intrusion detection, anti-virus software and encryption.	knowledge
airport electrical systems	data analytics	data analysis	7	Know the different elements that comprise airport electrical systems, such as air navigation equipment, electronic landing aids, radars, and meteorological services. Know the function and operation of each of these elements.	knowledge
operate marine communication systems	data analytics	decision making	10	Operate on board marine communication systems; communicate with other ships or with on-shore control centre e.g. to send urgent messages concerning safety; transmit or receive alerts, etc.	skill/competence

With the support of the Erasmus+ Programme of the European Union

Skill	Technology	Application	Relevance	Description	Type
object-oriented modelling	data analytics	monitoring	9	The object-oriented paradigm, which is based on classes, objects, methods and interfaces and their application in software design and analysis, programming organisation and techniques.	knowledge
object-oriented modelling	data analytics	planning	9	The object-oriented paradigm, which is based on classes, objects, methods and interfaces and their application in software design and analysis, programming organisation and techniques.	knowledge
assemble bombs	information system	communication	8	Tighten pierced and threaded plugs into the base of aerial bombs. Slip metal sleeves around the projectile, and pack the product in metal containers together with additional identification data.	skill/competence
types of media	information system	communication	9	The means of mass communication, such as television, journals, and radio, that reach and influence the majority of the public.	knowledge
schedule and dispatch drivers	information system	positioning	8	Schedule and dispatch drivers, working equipment and service vehicles to desired locations as requested by customers; use telephone or radio communication.	skill/competence
schedule and dispatch drivers	information system	positioning	9	Schedule and dispatch drivers, working equipment and service vehicles to desired locations as requested by customers; use telephone or radio communication.	skill/competence
manage dispatch software systems;	interfaces	communication	9	Manage dispatch software systems to execute tasks such as work order generation, route planning, and other activities.	skill/competence
3D modelling	interfaces	communication	10	The process of developing a mathematical representation of any three-dimensional surface of an object via specialised software. The product is called a 3D model. It can be displayed as a two-dimensional image through a process called 3D rendering or used in a computer simulation of physical phenomena. The model can also be physically created using 3D printing devices.	knowledge
identify electronic signals	interfaces	planning	7	Perform signal identification by analysing collected parameters in different languages and by electromagnetic radiation. These signals mostly originate in defense networks and are emitted from electronic parts such as radars and aircraft.	skill/competence

With the support of the Erasmus+ Programme of the European Union

Skill	Technology	Application	Relevance	Description	Type
log transmitter readings	interfaces	programming	5	Log transmitter observations such as calibrations of remote control equipment, equipment performance measurements, antenna field strength measurements, and other readings.	skill/competence
monitor system performance	interfaces	programming	9	Measure system reliability and performance before, during and after component integration and during system operation and maintenance. Select and use performance monitoring tools and techniques, such as special software.	skill/competence
use reservoir surveillance	interfaces	programming	8	Understand and operate well and reservoir surveillance system and remote sensing technology; monitor the reservoir level and decide on engineering interventions if necessary.	skill/competence
electronics	interfaces	programming	9	The functioning of electronic circuit boards, processors, chips, and computer hardware and software, including programming and applications. Apply this knowledge to ensure electronic equipment runs smoothly.	knowledge
Objective-C	management system	communication	9	The techniques and principles of software development, such as analysis, algorithms, coding, testing and compiling of programming paradigms in Objective-C.	knowledge
coordinate remote communications	management system	communication	9	Direct network and radio communications between different operational units. Receive and transfer further radio or telecom messages or calls. These might include messages from the public, or the emergency services.	skill/competence
tools for software configuration management	management system	monitoring	8	The software programs to perform configuration identification, control, status accounting and audit, such as CVS, ClearCase, Subversion, GIT and TortoiseSVN perform this management.	knowledge
operate armoured fighting vehicles	mobile	communication	8	Operate armoured fighting vehicles, such as tanks, armoured cars, air defense vehicles and troop carriers, using correct navigation systems and monitoring controls, as well as operating its weapons.	skill/competence
maintain emergency vehicle equipment	mobile	communication	8	Maintain emergency vehicles and the associated medical and communication equipment, replenishing first-aid equipment and supplies as needed.	skill/competence

With the support of the Erasmus+ Programme of the European Union

Skill	Technology	Application	Relevance	Description	Type
supervise maintenance activities in airports	mobile	communication	8	Supervise airport staff during operational and maintenance activities such as aeroplane refuelling, flight communications, runway maintenance, etc.	skill/competence
perform scrambling operations	mobile	communication	9	Control and monitor the air force radio network and perform scrambling operations or intrusions, which mean to disrupt the functioning of adverse emissions. Scrambling is mostly performed on voice communication and signals by the use of Digital Signal Processors (DSP).	skill/competence
install blinds drive systems	mobile	logistic	7	Install mechanical and electrical blinds drive systems such as cranks and tubular motors. If necessary, install and connect the computer control systems such as remote control, sun and wind sensors.	skill/competence
aquaculture production planning software	mobile	monitoring	9	The functioning principles and usage of a software dedicated to the planning of aquculture production.	knowledge
coordinate rail services	mobile	navigation	10	Effectively manage a team within a variety of rail services such as rail information and communication systems, station and train accessibility, hygiene and cleanliness, safety, security, disruption and incident investigation, to permanently ensure high levels of customer satisfaction.	skill/competence
operate armoured fighting vehicles	mobile	planning	8	Operate armoured fighting vehicles, such as tanks, armoured cars, air defense vehicles and troop carriers, using correct navigation systems and monitoring controls, as well as operating its weapons.	skill/competence
repair ICT devices	radar	communication	7	Maintain and repair ICT related equipment such as laptops, desktops, tablets, mobile devices, communications equipment, printers and any piece of computer related peripheral. Detect faults, malfunctions and replace parts if necessary.	skill/competence
operate railway communication systems	radar	identification	10	Operate railway communication systems; make announcements over the public address system or communicate with central train administration.	skill/competence
teach computer science	radar	identification	9	Instruct students in the theory and practice of computer science, more specifically in the development of software systems,	skill/competence

Skill	Technology	Application	Relevance	Description	Type
				programming languages, artificial intelligence, and software security.	
use warp knitting technologies	radar	navigation	9	Use warp knitting machine technologies that enable the formation of fabrics. Able to set machines for warp knitting, colour and pattern for monitoring and controlling the warp knitting process on electronic automatic warp knitting machines equipped with multifunction microprocessor and software.	skill/competence
types of satellites	radar	navigation	9	Understand the variety of satellites that exist and their different functions. Know the different types of satellites used for communications, streaming services, surveillance, and scientific research.	knowledge
types of satellites	radar	navigation	7	Understand the variety of satellites that exist and their different functions. Know the different types of satellites used for communications, streaming services, surveillance, and scientific research.	knowledge
repair ICT devices	radar	navigation	10	Maintain and repair ICT related equipment such as laptops, desktops, tablets, mobile devices, communications equipment, printers and any piece of computer related peripheral. Detect faults, malfunctions and replace parts if necessary.	skill/competence
AJAX	radar	navigation	9	The techniques and principles of software development, such as analysis, algorithms, coding, testing and compiling of programming paradigms in AJAX.	knowledge
teach computer science	radar	navigation	8	Instruct students in the theory and practice of computer science, more specifically in the development of software systems, programming languages, artificial intelligence, and software security.	skill/competence
SAP R3	radar	navigation	9	The techniques and principles of software development, such as analysis, algorithms, coding, testing and compiling of programming paradigms in SAP R3.	knowledge

With the support of the Erasmus+ Programme of the European Union

Skill	Technology	Application	Relevance	Description	Type
design microelectromechanical systems	radar	surveillance	10	Design and develop microelectromechanical systems (MEMS), such as microsensing devices. Make a model and a simulation using technical design software to assess the viability of the product and examine the physical parameters to ensure a successful production process.	skill/competence
specialised astrology software	radio	communication	7	The software that is used to gather and interpret data on the relevant positioning of celestial objects in order to deduct their influence on human life.	knowledge
use specific data analysis software	radio	communication	6	Use specific software for data analysis, including statistics, spreadsheets, and databases. Explore possibilities in order to make reports to managers, superiors, or clients.	skill/competence
Python (computer programming)	radio	communication	9	The techniques and principles of software development, such as analysis, algorithms, coding, testing and compiling of programming paradigms in Python.	knowledge
business ICT systems	radio	communication	9	The software packages, hardware devices and new technologies used in supporting business processes such as enterprise resource planning (ERP), customer relationship management (CRM), mobile devices and network solutions.	knowledge
business ICT systems	radio	communication	8	The software packages, hardware devices and new technologies used in supporting business processes such as enterprise resource planning (ERP), customer relationship management (CRM), mobile devices and network solutions.	knowledge
monitor after sales records	radio	communication	6	Keep an eye on the after sales feedback and monitor customer satisfaction or complaints; record after sales calls for thorough data analysis.	skill/competence
guide operation of heavy construction equipment	radio	communication	9	Guide a colleague in operating a piece of heavy construction equipment. Follow the operation closely and understand when feedback is called for. Use communication techniques like voice, two-way radio, agreed-upon gestures and whistles to signal the appropriate information to the operator.	skill/competence

With the support of the Erasmus+ Programme of the European Union

Skill	Technology	Application	Relevance	Description	Type
prepare horoscopes	radio	communication	7	Make a prediction of a person's future, analyse a person's character, including talents, compatibility of two persons, the best moment to start a journey or get married, based on that person's birth date and the relative positioning of celestial objects based on astrological interpretation. These forecasts can be daily, weekly or monthly. Use specialised software to draw different types of astrological charts, such as birth charts, transit charts, solar return charts, synastry charts or progressed charts.	skill/competence
call-centre technologies	radio	communication	9	The wide range of telecommunications hardware and software such as automated phone systems and communication devices.	knowledge
plot shipping navigation routes	radio	communication	7	Plot the navigation route of a vessel under the review of a superior deck officer. Operate a ship radar or electronic charts and automatic identification system.	skill/competence
operate an emergency communication system	radio	communication	9	Efficiently operate common communication systems used in emergencies, such as base station mobile transmitters and receivers, portable transmitters and receivers, repeaters, cellular phones, pagers, automated vehicle locators, and satellite phones as required.	skill/competence
software interaction design	radio	imagery	9	The methodologies for designing interaction between users and a software product or service to satisfy the needs and preferences of most of the people who will interface with the product and to simplify the communication between product and user such as Goal-oriented design.	knowledge
plot shipping navigation routes	radio	imagery	7	Plot the navigation route of a vessel under the review of a superior deck officer. Operate a ship radar or electronic charts and automatic identification system.	skill/competence
perform dental radiographs	radio	monitoring	7	Take and develop dental radiographs or x-rays for patients, by properly positioning the patient and film/image receptor to take intra- and extra-oral radiographs, applying all regulations for patient safety (shielding, operator protection, beam collimation).	skill/competence

With the support of the Erasmus+ Programme of the European Union

Skill	Technology	Application	Relevance	Description	Type
operate an emergency communication system	radio	monitoring	10	Efficiently operate common communication systems used in emergencies, such as base station mobile transmitters and receivers, portable transmitters and receivers, repeaters, cellular phones, pagers, automated vehicle locators, and satellite phones as required.	skill/competence
use specific data analysis software	radio	navigation	8	Use specific software for data analysis, including statistics, spreadsheets, and databases. Explore possibilities in order to make reports to managers, superiors, or clients.	skill/competence
operate an emergency communication system	radio	planning	10	Efficiently operate common communication systems used in emergencies, such as base station mobile transmitters and receivers, portable transmitters and receivers, repeaters, cellular phones, pagers, automated vehicle locators, and satellite phones as required.	skill/competence
operate an emergency communication system	radio	planning	8	Efficiently operate common communication systems used in emergencies, such as base station mobile transmitters and receivers, portable transmitters and receivers, repeaters, cellular phones, pagers, automated vehicle locators, and satellite phones as required.	skill/competence
software interaction design	radio	positioning	9	The methodologies for designing interaction between users and a software product or service to satisfy the needs and preferences of most of the people who will interface with the product and to simplify the communication between product and user such as Goal-oriented design.	knowledge
create infrared imagery	radio	programming	7	Use an infrared camera to produce imagery displaying the infrared part of the spectrum.	skill/competence
operate an emergency communication system	radio	simulation	9	Efficiently operate common communication systems used in emergencies, such as base station mobile transmitters and receivers, portable transmitters and receivers, repeaters, cellular phones, pagers, automated vehicle locators, and satellite phones as required.	skill/competence

With the support of the Erasmus+ Programme of the European Union

Skill	Technology	Application	Relevance	Description	Type
Jenkins (tools for software configuration management)	receivers	communication	8	The tool Jenkins is a software program to perform configuration identification, control, status accounting and audit of software during its development and maintenance.	knowledge
follow manufacturer guidelines in use of airport equipment	robot	monitoring	8	Follow advice provided by manufacturers on the use and maintenance of the different vehicles, equipment, and instruments used in airports. Establish communication processes with manufacturers and understand all the mechanical, electrical, and preventive, actions needed to utilise equipment effectively.	skill/competence
food safety standards	robot	remote control	8	Food safety standards (i.e. ISO 22000) developed by the recognised organisations for Standardization dealing with food safety. For example, the ISO 22000 international standard specifies the requirements for an effective food safety management system. It covers interactive communication, system management, prerequisite programs and HACCP principles.	knowledge
install electronic communication devices on trains	satellites	communication	6	Install, adjust, and test electronic communication equipment, which includes sound, security, navigation, and surveillance systems.	skill/competence
Haskell	satellites	communication	9	The techniques and principles of software development, such as analysis, algorithms, coding, testing and compiling of programming paradigms in Haskell.	knowledge
SAS language	satellites	communication	9	The techniques and principles of software development, such as analysis, algorithms, coding, testing and compiling of programming paradigms in SAS language.	knowledge
Common Lisp	satellites	data analysis	9	The techniques and principles of software development, such as analysis, algorithms, coding, testing and compiling of programming paradigms in Common Lisp.	knowledge
network management system tools	satellites	data processing	9	The software or hardware tools which enable monitoring, analysis and supervision of individual network components or network parts within a larger network system.	knowledge

With the support of the Erasmus+ Programme of the European Union

Skill	Technology	Application	Relevance	Description	Type
install electronic communication devices on trains	satellites	mission	8	Install, adjust, and test electronic communication equipment, which includes sound, security, navigation, and surveillance systems.	skill/competence
Lisp	satellites	monitoring	9	The techniques and principles of software development, such as analysis, algorithms, coding, testing and compiling of programming paradigms in Lisp.	knowledge
install electronic communication devices on trains	satellites	navigation	5	Install, adjust, and test electronic communication equipment, which includes sound, security, navigation, and surveillance systems.	skill/competence
design electronic systems	satellites	navigation	10	Draft sketches and design electronic systems, products, and components using Computer Aided Design (CAD) software and equipment. Make a simulation so that an assessment can be made of the viability of the product and so the physical parameters can be examined before the actual building of the product.	skill/competence
use interface description language	satellites	navigation	9	Utilise specification language for describing interface connection among software components or programs in a programming-language-independent way. The languages which support this method are among others CORBA and WSDL.	skill/competence
computer programming	satellites	navigation	9	The techniques and principles of software development, such as analysis, algorithms, coding, testing and compiling of programming paradigms (e.g. object oriented programming, functional programming) and of programming languages.	knowledge
use interface description language	satellites	planning	9	Utilise specification language for describing interface connection among software components or programs in a programming-language-independent way. The languages which support this method are among others CORBA and WSDL.	skill/competence
Erlang	satellites	surveillance	9	The techniques and principles of software development, such as analysis, algorithms, coding, testing and compiling of programming paradigms in Erlang.	knowledge

With the support of the Erasmus+ Programme of the European Union

Skill	Technology	Application	Relevance	Description	Type
Smalltalk (computer programming)	sensor	monitoring	9	The techniques and principles of software development, such as analysis, algorithms, coding, testing and compiling of programming paradigms in Smalltalk.	knowledge
software anomalies	sensor	monitoring	8	The deviations of what is standard and exceptional events during software system performance, identification of incidents that can alter the flow and the process of system execution.	knowledge
Assembly (computer programming)	sensor	monitoring	9	The techniques and principles of software development, such as analysis, algorithms, coding, testing and compiling of programming paradigms in Assembly.	knowledge
Prolog (computer programming)	sensor	remote control	9	The techniques and principles of software development, such as analysis, algorithms, coding, testing and compiling of programming paradigms in Prolog.	knowledge
OpenEdge Advanced Business Language	sensor	remote control	9	The techniques and principles of software development, such as analysis, algorithms, coding, testing and compiling of programming paradigms in OpenEdge Advanced Business Language.	knowledge
Chef (tools for software configuration management)	server	identification	8	The tool Chef is a software program which performs infrastructure configuration identification, control and automation aiming to ease the applications deployment.	knowledge
R	server	programming	9	The techniques and principles of software development, such as analysis, algorithms, coding, testing and compiling of programming paradigms in R.	knowledge
execute ICT user research activities	software	authentication	6	Perform research tasks such as recruitment of participants, scheduling of tasks, collecting of empirical data, data analysis and production of materials in order to assess the interaction of users with an ICT system, program or application.	skill/competence
ML (computer programming)	software	communication	9	The techniques and principles of software development, such as analysis, algorithms, coding, testing and compiling of programming paradigms in ML.	knowledge
operate stowage programmes	software	communication	9	Operate stowage programmes used for controlling stability in vessels, loading operations, and cargo planning processes. Interpret graphical interfaces, stowage data and scenario variables.	skill/competence

With the support of the Erasmus+ Programme of the European Union

Skill	Technology	Application	Relevance	Description	Type
use online communication tools	software	communication	9	Use digital tools which enable various forms of communication over Internet, such as e-mail, instant messaging, Voice over Internet Protocol, social networks, while following netiquette rules and protecting one's reputation and digital identity.	skill/competence
use mine planning software	software	communication	9	Use specialised software to plan, design and model for mining operations.	skill/competence
manage closed-circuit television system	software	communication	7	Oversee a system of cameras inside a facility which transmit a signal to a specific set of display devices.	skill/competence
monitor vehicle maintenance activities	software	communication	8	Supervise and perform vehicle maintenance activities, which can be either mechanical, electrical or computerized. It consists of replacing a number of vehicle parts and checking instrumentation and liquid levels.	skill/competence
interact with programmer on intention of consultancy work	software	data analysis	9	Ask the programmer or direction team about the intent of your consultancy work, whether it be to follow and improve the current vision, to build customers loyalty, to address a new audience, to change or re-orient the artistic line, etc. Clarify the extent to which the choreologist should be involved in the development of the artistic vision, programming season, or project, and adapt yourself to different leadership styles.	skill/competence
operate radar equipment	software	data analysis	7	Operate radar screens and other radar equipment; ensure that aircraft fly at a safe distance from one another.	skill/competence
manage standard enterprise resource planning system	software	data processing	9	Collect, manage and interpret data relevant for companies related to shipping, payment, inventory, resources and manufacturing using specific business management software. Such software as Microsoft Dynamics, SAP ERP, Oracle ERP.	skill/competence
TypeScript	software	decision making	9	The techniques and principles of software development, such as analysis, algorithms, coding, testing and compiling of programming paradigms in TypeScript.	knowledge
process collected survey data	software	decision making	7	Analyse and interpret survey data acquired from a wide variety of sources e.g. satellite surveys, aerial photography and laser measurement systems.	skill/competence

With the support of the Erasmus+ Programme of the European Union

Skill	Technology	Application	Relevance	Description	Type
guidance, navigation and control	software	decision making	8	The engineering discipline that deals with the design and development of systems that can control the motion of automobiles, ships, space- and aircraft. It includes control over vehicle's trajectory from its present location to a designated target and vehicle's speed and altitude.	knowledge
program firmware	software	decision making	9	Program permanent software with a read-only memory (ROM) on a hardware device, such as an integrated circuit.	skill/competence
C++	software	encryption	9	The techniques and principles of software development, such as analysis, algorithms, coding, testing and compiling of programming paradigms in C++.	knowledge
WebCMS	software	identification	9	The web-based software systems used for creating, editing, publishing and archiving blogs, articles, web pages or press releases which are mostly managed by users with limited web programming knowledge.	knowledge
standards for web-based e-learning	software	identification	8	The standards and specifications used for web-based e-learning, such as Sharable Content Object Reference Model (SCORM), which define communications between client side content and a host system supported by a learning management system.	knowledge
use online communication tools	software	identification	6	Use digital tools which enable various forms of communication over Internet, such as e-mail, instant messaging, Voice over Internet Protocol, social networks, while following netiquette rules and protecting one's reputation and digital identity.	skill/competence
install electronic communication devices on trains	software	identification	7	Install, adjust, and test electronic communication equipment, which includes sound, security, navigation, and surveillance systems.	skill/competence
network management system tools	software	identification	7	The software or hardware tools which enable monitoring, analysis and supervision of individual network components or network parts within a larger network system.	knowledge
conduct analysis of ship data	software	identification	8	Collect information from a vessel's management software and cross reference it to analyse the data from different points of view. Analyse data and apply judgement to inform decision-making.	skill/competence

With the support of the Erasmus+ Programme of the European Union

Skill	Technology	Application	Relevance	Description	Type
airport planning	software	identification	8	Know airport planning for different types of aircrafts; use that information to mobilise resources and people in order to handle the aircrafts while they are in the airport.	knowledge
telecommunications engineering	software	identification	10	Discipline that combines computer science with electrical engineering to improve telecommunications systems.	knowledge
identify service requirements	software	identification	8	Interpret customers' descriptions of vehicle problems; translate these issues into concrete instructions for mechanics and technicians.	skill/competence
process collected survey data	software	identification	7	Analyse and interpret survey data acquired from a wide variety of sources e.g. satellite surveys, aerial photography and laser measurement systems.	skill/competence
ICT system programming	software	messaging	9	The methods and tools required to develop system software, specifications of system architectures and interfacing techniques between network and system modules and components.	knowledge
Groovy	software	monitoring	9	The techniques and principles of software development, such as analysis, algorithms, coding, testing and compiling of programming paradigms in Groovy.	knowledge
implement ICT network diagnostic tools	software	monitoring	8	Use software tools or components that monitor ICT network parameters, such as performance and throughput, provide data and statistics, diagnose errors, failures or bottlenecks and support decision making.	skill/competence
COBOL	software	monitoring	9	The techniques and principles of software development, such as analysis, algorithms, coding, testing and compiling of programming paradigms in COBOL.	knowledge
interpret graphical communication interfaces	software	monitoring	9	Have the capacity to understand the various shapes and representations used in the schematics and 3D isometric model presented by communication programmes.	skill/competence
innovate in ICT	software	planning	10	Create and describe new original research and innovation ideas within the field of information and communication technologies, compare to the emerging technologies and trends and plan the development of new ideas.	skill/competence

With the support of the Erasmus+ Programme of the European Union

Skill	Technology	Application	Relevance	Description	Type
Swift (computer programming)	software	planning	9	The techniques and principles of software development, such as analysis, algorithms, coding, testing and compiling of programming paradigms in Swift.	knowledge
VBScript	software	planning	9	The techniques and principles of software development, such as analysis, algorithms, coding, testing and compiling of programming paradigms in VBScript.	knowledge
analyse X-ray imagery	software	planning	5	Analyse X-ray imagery in order to locate the sources of patients` difficulties and interpret the findings.	skill/competence
electronic signals intelligence	software	planning	9	The types of military intelligence-gathering by the use of electronic sensors.	knowledge
guidance, navigation and control	software	planning	8	The engineering discipline that deals with the design and development of systems that can control the motion of automobiles, ships, space- and aircraft. It includes control over vehicle's trajectory from its present location to a designated target and vehicle's speed and altitude.	knowledge
monitor radiation levels	software	planning	8	Use measuring and testing equipment and techniques to identify the levels of radiation or radioactive substances in order to control exposure and minimise health, safety, and environmental risks.	skill/competence
computer technology	software	planning	9	Computers, computer networks and other information technologies and equipment that can store, retrieve, transmit and manipulate data.	knowledge
design ventilation network	software	planning	9	Draft ventilation network. Prepare and plan the ventilation layout using specialist software. Design heating or cooling systems as required. Improve efficiency of ventilation network to lower energy consumption.	skill/competence
inspect rail from track inspection vehicle	software	planning	9	Monitor the output from various sensors that detect flaws in a railroad track, including laser sensors which scan for discontinuities, microphone sensors, gyroscopes which detect tilt, and others.	skill/competence

With the support of the Erasmus+ Programme of the European Union

Skill	Technology	Application	Relevance	Description	Type
Scala	software	positioning	9	The techniques and principles of software development, such as analysis, algorithms, coding, testing and compiling of programming paradigms in Scala.	knowledge
decision support systems	software	positioning	8	The ICT systems that can be used to support business or organisational decision making.	knowledge
APL	software	programming	9	The techniques and principles of software development, such as analysis, algorithms, coding, testing and compiling of programming paradigms in APL.	knowledge
Puppet (tools for software configuration management)	software	programming	8	The tool Puppet is a software program to perform configuration identification, control, status accounting and audit.	knowledge
STAF	software	programming	8	The tool STAF is a software program to perform configuration identification, control, status accounting and audit.	knowledge
WordPress	software	programming	9	The open-source web-based software systems used for creating, editing, publishing and archiving blogs, articles, web pages or press releases which are mostly managed by users with limited web programming knowledge.	knowledge
Ansible	software	programming	8	The tool Ansible is a software program to perform configuration identification, control, status accounting and audit.	knowledge
GameSalad	software	programming	9	The drag-and-drop software interface that consists of specialised design tools used for the rapid iteration of user-derived computer games by users with limited programming knowledge.	knowledge
GameSalad	software	programming	9	The drag-and-drop software interface that consists of specialised design tools used for the rapid iteration of user-derived computer games by users with limited programming knowledge.	knowledge
Oracle Application Development Framework	software	programming	9	The Java framework software development environment which provide specific features and components (such as enhanced reusability features, visual and declarative programming) that support and guide enterprise applications development.	knowledge

With the support of the Erasmus+ Programme of the European Union

Skill	Technology	Application	Relevance	Description	Type
CoffeeScript	software	programming	9	The techniques and principles of software development, such as analysis, algorithms, coding, testing and compiling of programming paradigms in CoffeeScript.	knowledge
MATLAB	software	programming	9	The techniques and principles of software development, such as analysis, algorithms, coding, testing and compiling of programming paradigms in MATLAB.	knowledge
Scratch (computer programming)	software	programming	9	The techniques and principles of software development, such as analysis, algorithms, coding, testing and compiling of programming paradigms in Scratch.	knowledge
Pascal (computer programming)	software	programming	9	The techniques and principles of software development, such as analysis, algorithms, coding, testing and compiling of programming paradigms in Pascal.	knowledge
ABAP	software	programming	9	The techniques and principles of software development, such as analysis, algorithms, coding, testing and compiling of programming paradigms in ABAP.	knowledge
mobile marketing	software	programming	10	The study of marketing which uses mobile devices as a communication channel. This approach can provide potential customers with personalised information (using location or time context) which promotes products, services or ideas.	knowledge
use a computer	software	programming	9	Utilise computer equipment or digital devices to facilitate quality control, data management, and communication. Follow instructions given by a computer programme, create computer files or documents.	skill/competence
handle surveillance equipment	software	programming	7	Monitor surveillance equipment to observe what people are doing in a given area and ensure their safety.	skill/competence
interact through digital technologies	software	programming	9	Interact through a variety of digital technologies and understand appropriate digital communication means for a given context.	skill/competence
ICT project management methodologies	software	programming	9	The methodologies or models for planning, managing and overseeing of ICT resources in order to meet specific goals, such methodologies are Waterfall, Incremental, V-Model, Scrum or Agile and using project management ICT tools.	knowledge

With the support of the Erasmus+ Programme of the European Union

Skill	Technology	Application	Relevance	Description	Type
apply frequency management	software	programming	9	Develop and manage multiple communication channels to produce extra capacity in the VHF-COM band.	skill/competence
use aeronautical mobile service communications	software	programming	10	Make use of aeronautical communications devices to transmit and receive technical information to and from aircraft, in line with technical regulations and provisions.	skill/competence
use aeronautical mobile service communications	software	programming	9	Make use of aeronautical communications devices to transmit and receive technical information to and from aircraft, in line with technical regulations and provisions.	skill/competence
Jenkins (tools for software configuration management)	software	programming	7	The tool Jenkins is a software program to perform configuration identification, control, status accounting and audit of software during its development and maintenance.	knowledge
connect vehicle maintenance and operations departments	software	programming	8	Establish communication between maintenance and operations planning departments. Ensure professional operations that meet designated schedules; ensure equipment performance and availability.	skill/competence
connect vehicle maintenance and operations departments	software	programming	8	Establish communication between maintenance and operations planning departments. Ensure professional operations that meet designated schedules; ensure equipment performance and availability.	skill/competence
install electronic communication devices on trains	software	programming	10	Install, adjust, and test electronic communication equipment, which includes sound, security, navigation, and surveillance systems.	skill/competence
install electronic communication devices on trains	software	programming	6	Install, adjust, and test electronic communication equipment, which includes sound, security, navigation, and surveillance systems.	skill/competence
visual flight rules	software	programming	8	Types of flight rules which are a compilation of regulations that allow pilots to fly aircrafts in clear as well as unclear weather conditions whereby it is declared that outside visual reference to the ground and other obstructions are not safe.	knowledge
use modern electronic navigational aids	software	programming	7	Use modern navigational aids such as GPS and radar systems.	skill/competence

With the support of the Erasmus+ Programme of the European Union

Skill	Technology	Application	Relevance	Description	Type
make radiographic images	software	programming	5	Produce radiographic images to detect flaws in objects.	skill/competence
conduct analysis of ship data	software	programming	8	Collect information from a vessel's management software and cross reference it to analyse the data from different points of view. Analyse data and apply judgement to inform decision-making.	skill/competence
develop data link services for navigation purposes	software	programming	8	Develop and implement data link services and satellite technologies for air-ground communication operations.	skill/competence
select auxiliary equipment for photographic work	software	programming	7	Bring the appropriate auxiliary equipment according to the environment of the photographic work, whether you are stationary or mobile. Make sure you are prepared to capture the desired motif.	skill/competence
position vehicles for maintenance and repair	software	programming	8	Place vehicles in the right position (such as on top of a pneumatic lift) for repair and maintenance tasks. Follow safety procedures.	skill/competence
use software design patterns	software	programming	9	Utilise reusable solutions, formalised best practices, to solve common ICT development tasks in software development and design.	skill/competence
operate railway vehicles	software	programming	8	Drive railroad vehicles or other railway equipment in a competent and safe manner.	skill/competence
plan space satellite missions	software	programming	7	Plan missions to either launch, release, or capture satellites in orbit. Plan launch windows for each one of these activities and the steps required for a successful mission, such as preparation of launch sites, and agreements with launch partners.	skill/competence
monitor media industry research figures	software	programming	8	Keep up to date with distribution figures of the various printed media outlets such as newspapers and journals; with the audience figures of radio and television or of specific broadcast programs; and of those of online outlets such as search engine optimisation and pay-per-click results.	skill/competence
process collected survey data	software	programming	7	Analyse and interpret survey data acquired from a wide variety of sources e.g. satellite surveys, aerial photography and laser measurement systems.	skill/competence

With the support of the Erasmus+ Programme of the European Union

Skill	Technology	Application	Relevance	Description	Type
process collected survey data	software	programming	7	Analyse and interpret survey data acquired from a wide variety of sources e.g. satellite surveys, aerial photography and laser measurement systems.	skill/competence
camouflage	software	programming	8	The different kinds of materials and specialised clothing used for concealment of people, vehicles or other equipment.	knowledge
develop software prototype	software	programming	10	Create a first incomplete or preliminary version of a piece of software application to simulate some specific aspects of the final product.	skill/competence
use automatic programming	software	programming	9	Utilise specialised software tools to generate computer code from specifications, such as diagrams, structured informations or other means of describing functionality.	skill/competence
use reservoir surveillance	software	programming	7	Understand and operate well and reservoir surveillance system and remote sensing technology; monitor the reservoir level and decide on engineering interventions if necessary.	skill/competence
develop programming schedule	software	programming	7	Develop a schedule for the broadcast of television and radio programs. Decide how much airtime a program gets.	skill/competence
plan marketing campaign	software	programming	7	Develop a method to promote a product through different channels, such as television, radio, print and online platforms, social media with the aim to communicate and deliver value to customers.	skill/competence
supervise maintenance activities in airports	software	programming	8	Supervise airport staff during operational and maintenance activities such as aeroplane refuelling, flight communications, runway maintenance, etc.	skill/competence
monitor traffic flow	software	programming	8	Monitor the traffic that passes by a certain point, like for instance a pedestrian crossing. Monitor the amount of vehicles, the speed at which they go by and the interval between the passing by of two successive cars.	skill/competence
monitor after sales records	software	programming	6	Keep an eye on the after sales feedback and monitor customer satisfaction or complaints; record after sales calls for thorough data analysis.	skill/competence

With the support of the Erasmus+ Programme of the European Union

Skill	Technology	Application	Relevance	Description	Type
monitor vehicle fleet operations	software	programming	8	Monitor the operations of the vehicle fleet; track delays and identify repair needs; analyse fleet information to develop and implement improvement actions.	skill/competence
monitor satellites	software	programming	8	Analyse ground systems and investigate any anomalous behavior of satellites. Develop the right corrective measures, and implement where necessary.	skill/competence
Vagrant	software	simulation	8	The tool Vagrant is a software program to perform configuration identification, control, status accounting and audit.	knowledge
oversee development of software	software	simulation	9	Organise, plan and supervise the development of the applications and frameworks in order to create a software product, from the earliest planning stages to the final product test.	skill/competence
Salt (tools for software configuration management)	software	simulation	8	The tool Salt is a software program to perform configuration identification, control, status accounting and audit.	knowledge
develop data processing applications	software	simulation	9	Create a customised software for processing data by selecting and using the appropriate computer programming language in order for an ICT system to produce demanded output based on expected input.	skill/competence
statistics	software	simulation	5	The study of statistical theory, methods and practices such as collection, organisation, analysis, interpretation and presentation of data. It deals with all aspects of data including the planning of data collection in terms of the design of surveys and experiments in order to forecast and plan work-related activities.	knowledge
design scale models	software	simulation	8	Design imitations of products such as vehicles or buildings which accurately represent the dimensions of the product in a smaller format.	skill/competence
use IT tools	surveillance systems	communication	9	Application of computers, computer networks and other information technologies and equipment to storing, retrieving, transmitting and manipulating data, in the context of a business or enterprise.	skill/competence

With the support of the Erasmus+ Programme of the European Union

Skill	Technology	Application	Relevance	Description	Type
control compliance of railway vehicles regulations	surveillance systems	monitoring	8	Inspect rolling stock, components and systems to ensure compliance with standards and specifications.	skill/competence
maintain radio communications equipment	surveillance systems	navigation	9	Perform testing or repairing activities on radio transmitting and receiving equipment, such as testing control circuits.	skill/competence
monitor stationary rail sensors	surveillance systems	surveillance	9	Monitor a variety of sensors, such as heat sensors and wheel impact load sensors, that detect flaws in railway and train operations. Check the output from the sensors from a distance or visit the location.	skill/competence
monitor vehicle repairs	surveillance systems	surveillance	8	Schedule and oversee activities of care and repair for vehicles.	skill/competence
develop data processing applications	surveillance systems	surveillance	8	Create a customised software for processing data by selecting and using the appropriate computer programming language in order for an ICT system to produce demanded output based on expected input.	skill/competence
perform online data analysis	tablet	communication	6	Analyse online experiences and online data for purposes of understanding user behaviour, triggers of online attention, and other factors that could optimise webpage development and exposure.	skill/competence
conduct analysis of ship data	vehicles	communication	6	Collect information from a vessel's management software and cross reference it to analyse the data from different points of view. Analyse data and apply judgement to inform decision-making.	skill/competence
use ICT systems	vehicles	communication	10	Select and use ICT systems for a variety of complex tasks in order to meet a variety of needs.	skill/competence
analyse big data	vehicles	communication	7	Collect and evaluate numerical data in large quantities, especially for the purpose of identifying patterns between the data.	skill/competence
analyse oil operations data	vehicles	communication	6	Record and process operating data; comprehend and analyse documents, instruments and data results of laboratory analyses.	skill/competence
simplify communication in maritime management	vehicles	communication	10	Develop programs and procedures that simplify the exchange information between departments and stakeholders in maritime	skill/competence

Skill	Technology	Application	Relevance	Description	Type
				ship operations and management. Facilitate straightforward dialogue between the different actors involved in operations, such as crew, port servants, ship management, regulatory bodies, and clients.	
develop communication networks with shipping sites	vehicles	identification	10	Establish relationships with shipping sites to facilitate the delivery of goods.	skill/competence
process collected survey data	vehicles	identification	6	Analyse and interpret survey data acquired from a wide variety of sources e.g. satellite surveys, aerial photography and laser measurement systems.	skill/competence
conduct analysis of ship data	vehicles	monitoring	6	Collect information from a vessel's management software and cross reference it to analyse the data from different points of view. Analyse data and apply judgement to inform decision-making.	skill/competence
perform data analysis	vehicles	monitoring	6	Collect data and statistics to test and evaluate in order to generate assertions and pattern predictions, with the aim of discovering useful information in a decision-making process.	skill/competence
ICT system programming	vehicles	monitoring	7	The methods and tools required to develop system software, specifications of system architectures and interfacing techniques between network and system modules and components.	knowledge
perform safety data analysis	vehicles	monitoring	6	Use different safety databases to perform analyses of information on actual or potential safety threats.	skill/competence
conduct radiotherapy computer planning	vehicles	monitoring	7	Produce a three-dimensional plan of the distribution of radiation across the anatomical area to be treated.	skill/competence
conduct radiotherapy computer planning	vehicles	monitoring	9	Produce a three-dimensional plan of the distribution of radiation across the anatomical area to be treated.	skill/competence
interpret seismic data	vehicles	monitoring	6	Interpret data from seismic surveys.	skill/competence
select auxiliary equipment for photographic work	vehicles	navigation	5	Bring the appropriate auxiliary equipment according to the environment of the photographic work, whether you are stationary or mobile. Make sure you are prepared to capture the desired motif.	skill/competence

Skill	Technology	Application	Relevance	Description	Type
use methods of logistical data analysis	vehicles	navigation	6	Read and interpret supply chain and transportation data. Analyse the reliability and availability of findings by using methods such as data mining, data modelling and cost-benefit analysis.	skill/competence
analyse data for aeronautical publications	vehicles	navigation	6	Collect, edit, and most importantly analyse data received from civil aviation authorities and related services. Analyse the data to prepare amendments that are incorporated into aeronautical informational publications.	skill/competence
accommodate cargo in freight transport vehicle	vehicles	planning	8	Properly position, cushion, restrain and balance cargo.	skill/competence
statistics	vehicles	planning	6	The study of statistical theory, methods and practices such as collection, organisation, analysis, interpretation and presentation of data. It deals with all aspects of data including the planning of data collection in terms of the design of surveys and experiments in order to forecast and plan work-related activities.	knowledge
protect ICT devices	vehicles	planning	10	Protect devices and digital content, and understand risks and threats in digital environments. Know about safety and security measures and have due regard to reliability and privacy. Make use of tools and methods which maximise security of ICT devices and information by controlling access, such as passwords, digital signatures, biometry, and protecting systems such as firewall, antivirus, spam filters.	skill/competence
global navigation satellite system performance parameters	vehicles	positioning	8	Know the Global Navigation Satellite System (GNSS) performance parameters, and the requirements that an GNSS system should possess in specific conditions.	knowledge
surveillance radars	vehicles	positioning	7	Know that Mode A/C Secondary Surveillance Radar stations continuously interrogate all aircraft within their range. Know that Mode S Secondary Surveillance Radar stations carry out interrogations of aircraft within their coverage.	knowledge

Table 14 - Completed list of technical skills extracted form ESCO using the technologies and apllications of C4ISTAR.

Transversal skills

The transversal skills are extracted using ESCO dataset and O*NET with an automatic approach thanks to the text mining techniques, also known as Gazetteer-based approach as mentioned in the paragraph 2.2 “Identify skills”. The completed list of the entries extracted using ESCO repositories are shown in table 6. The table 6 contains for each skills:

- the skill label on ESCO;
- the type of skill classified from ESCO;
- the number of occurrences (n) in the C4ISTAR documents collection, as explained in the Appendix 3 “Gazeteer-based NER”.

Skill	Skill label on ESCO	Type	n
data	statistics	knowledge	2210
space	design principles	knowledge	1631
security	securities	knowledge	1164
planning	design ventilation network	skill/competence	833
communication	communication	knowledge	814
equipment	compile airport certification manuals	skill/competence	746
processes	perform ground-handling maintenance procedures	skill/competence	537
design	think creatively	skill/competence	510
term	terminology	knowledge	502
current	electricity principles	knowledge	449
r	R	knowledge	428
rights	patents	knowledge	411
interaction	communication	knowledge	380
coordination	logistics	knowledge	373
less	LESS	knowledge	359
form	design principles	knowledge	350
patterns	dies	knowledge	320
sensors	robotic components	knowledge	310
sensors	sensors	knowledge	310
endeavor	make an effort	skill/competence	306
french	French	knowledge	294
agile	ICT project management methodologies	knowledge	293
standard	scaffolding components	knowledge	293
logistics	logistics	knowledge	244
conduct	programme work according to incoming orders	skill/competence	243
political	politics	knowledge	240
lead	lead others	skill/competence	237
lead	provide leadership	skill/competence	237
radar	radars	knowledge	231
computer	computer equipment	knowledge	213
scale	design principles	knowledge	212
german	German	knowledge	211

Skill	Skill label on ESCO	Type	n
reserve	make reservations	skill/competence	204
experiment	think creatively	skill/competence	202
control system	control systems	knowledge	195
engineering	packaging engineering	knowledge	188
press	journalism	knowledge	187
board	scaffolding components	knowledge	171
continue	persist	skill/competence	155
recovery	repossession	knowledge	155
confidence	Assertiveness	knowledge	148
transport	logistics	knowledge	146
re	instrumentation equipment	knowledge	142
interact	interact with others	skill/competence	134
language	terminology	knowledge	132
reporting	journalism	knowledge	127
silver	precious metals	knowledge	126
history	history	knowledge	123
information technology	computer technology	knowledge	123
light	design principles	knowledge	123
drone	unmanned air systems	knowledge	121
balance	design principles	knowledge	108
computing equipment	computer equipment	knowledge	104
measurement	metrology	knowledge	103
energy	energy	knowledge	99
guide	give advice to others	skill/competence	99
decide	make decisions	skill/competence	93
and procedures	compile airport certification manuals	skill/competence	86
unity	design principles	knowledge	86
terminology	terminology	knowledge	84
detect	detect bottlenecks	skill/competence	82
risk assessment	risk management	knowledge	80
choose	make decisions	skill/competence	78
gold	precious metals	knowledge	78
logistic	logistics	knowledge	76
gps	geographic information systems	knowledge	75
italian	Italian	knowledge	75
survey	surveying	knowledge	75
electromagnetic spectrum	electromagnetic spectrum	knowledge	74
literature	literature	knowledge	73
database	database	knowledge	68
mechanisms	mechanical systems	knowledge	68
measuring	metrology	knowledge	67
make decisions	make decisions	skill/competence	66
integrity	morality	knowledge	60
radiation	heat transfer processes	knowledge	59

Skill	Skill label on ESCO	Type	n
english	English	knowledge	56
filters	manufacturing plant equipment	knowledge	56
radars	radars	knowledge	54
algorithms	algorithms	knowledge	53
consultation	consultation	knowledge	53
attempt	make an effort	skill/competence	51
control systems	automation technology	knowledge	50
control systems	control systems	knowledge	50
electronics	battery components	knowledge	50
electronics	consumer electronics	knowledge	50
electronics	electronics	knowledge	50
electronics	robotic components	knowledge	50
fuel	energy	knowledge	50
russian	Russian	knowledge	50
share information	circulate information	skill/competence	48
share information	work in teams	skill/competence	48
craft	crafting	knowledge	45
logic	logic	knowledge	45
congruence	design principles	knowledge	44
prediction	similitude	knowledge	44
schedule	manage time	skill/competence	44
risk management	risk management	knowledge	40
law enforcement	law enforcement	knowledge	39
collections	art collections	knowledge	38
communicating	communication	knowledge	38
strategic planning	strategic planning	knowledge	38
swedish	Swedish	knowledge	38
debate	rhetoric	knowledge	37
moral	morality	knowledge	36
petroleum	fossil fuels	knowledge	35
petroleum	petroleum	knowledge	35
health and safety	health and safety in the workplace	knowledge	34
resistance	electricity principles	knowledge	34
signals intelligence	electronic signals intelligence	knowledge	34
proportion	design principles	knowledge	33
economics	economics	knowledge	32
making decisions	make decisions	skill/competence	32
chinese	Chinese	skill/competence	31
explosives	explosives	knowledge	31
sustainability	environmental engineering	knowledge	30
spanish	Spanish	knowledge	29
emergency response	manage emergency procedures	skill/competence	28
philosophy	philosophy	knowledge	28
psychology	psychology	knowledge	28

Skill	Skill label on ESCO	Type	n
argument	rhetoric	knowledge	27
cisco	Cisco	knowledge	27
dutch	Dutch	knowledge	26
trademarks	trademarks	knowledge	26
try	make an effort	skill/competence	26
ng	natural gas	knowledge	25
robotics	robotics	knowledge	25
cameras	cameras	knowledge	24
international law	international law	knowledge	24
politics	politics	knowledge	23
retrieval	repossession	knowledge	23
algorithm	algorithms	knowledge	22
computer science	computer science	knowledge	21
data processing	process data	skill/competence	21
processor	security panels	knowledge	21
assertion	Assertiveness	knowledge	20
disseminate information	circulate information	skill/competence	20
geography	geographical areas relevant to tourism	knowledge	20
geography	geography	knowledge	20
georgian	Georgian	knowledge	19
assessment process	assessment processes	knowledge	18
cyber security	cyber security	knowledge	18
accounting	accounting	knowledge	17
cooling	casting processes	knowledge	17
uml	unified modelling language	knowledge	17
welsh	Welsh	knowledge	17
aeronautics	aerodynamics	knowledge	16
appliances	ensure vessel compliance with regulations	skill/competence	16
human rights	social justice	knowledge	16
medicine	medicines	knowledge	16
provide information	provide information	skill/competence	16
statistics	statistics	knowledge	16
switches	electrical equipment components	knowledge	16
a computer	computer equipment	knowledge	15
architecture design	architectural design	knowledge	15
be responsible	show responsibility	skill/competence	15
breaking	decommissioning	knowledge	15
cooperate	work in teams	skill/competence	15
lecture	perform lectures	skill/competence	15
business processes	business processes	knowledge	14
correspondence	communication	knowledge	14
cybernetics	cybernetics	knowledge	14
data protection	data protection	knowledge	14
migration	migration	knowledge	14

Skill	Skill label on ESCO	Type	n
purchase	apply procurement	skill/competence	14
separation	chemical processes	knowledge	14
service marks	trademarks	knowledge	14
accompany	keep company	skill/competence	13
defense system	defense system	knowledge	13
evaluating information	evaluate information	skill/competence	13
interview	use questioning techniques	skill/competence	13
strive	make an effort	skill/competence	13
system integration	ICT system integration	knowledge	13
air traffic control	air traffic management	knowledge	12
calculation	geometry	knowledge	12
calculation	mathematics	knowledge	12
cloud computing	cloud technologies	knowledge	12
collection management	collection management	knowledge	12
controllers	robotic components	knowledge	12
frames	optical components	knowledge	12
outlines	dies	knowledge	12
secure data	apply information security policies	skill/competence	12
solve problems	troubleshoot	skill/competence	12
communicate information	circulate information	skill/competence	11
connectors	climbing equipment	knowledge	11
danish	Danish	knowledge	11
data analytics	unstructured data	knowledge	11
electronic systems	electronics	knowledge	11
financial management	financial management	knowledge	11
highlighting	hair colouring	knowledge	11
mechanics	mechanics	knowledge	11
military training	military drill	knowledge	11
physics	physics	knowledge	11
be flexible	perform services in a flexible manner	skill/competence	10
business process	business processes	knowledge	10
collect data	gather data	skill/competence	10
ethics	ethics	knowledge	10
ethics	morality	knowledge	10
foreign affairs	foreign affairs	knowledge	10
internet of things	Internet of Things	knowledge	10
public health	community medicine	knowledge	10
public health	public health	knowledge	10
tailoring	dressmaking	knowledge	10
vocabulary	terminology	knowledge	10
airspace management	air traffic management	knowledge	9
conversation	communication	knowledge	9
creative thinking	think creatively	skill/competence	9
css	CSS	knowledge	9

Skill	Skill label on ESCO	Type	n
data analysis	statistics	knowledge	9
gis	geographic information systems	knowledge	9
remote sensing	geographic information systems	knowledge	9
remote sensing	remote sensing techniques	knowledge	9
semantics	semantics	knowledge	9
strategic plan	strategic planning	knowledge	9
telecommunication	concepts of telecommunications	knowledge	9
czech	Czech	knowledge	8
design principles	design principles	knowledge	8
information architecture	information architecture	knowledge	8
japanese	Japanese	knowledge	8
latin	Latin	knowledge	8
military planning	military logistics	knowledge	8
personal protective equipment	personal protective equipment	knowledge	8
provide evidence	present evidence	skill/competence	8
rs	geographic information systems	knowledge	8
service characteristics	characteristics of services	knowledge	8
unstructured data	unstructured data	knowledge	8
biometrics	biometrics	knowledge	7
communication science	communication sciences	knowledge	7
communication technology	transmission technology	knowledge	7
conveyance	conveyancing	knowledge	7
design process	design process	skill/competence	7
developing a model	develop models	skill/competence	7
ergonomics	ergonomics	knowledge	7
innovate	seek innovation in current practices	skill/competence	7
innovate	think creatively	skill/competence	7
leasing	leasing process	knowledge	7
personal development	personal development	knowledge	7
project management	project commissioning	knowledge	7
project management	project management	knowledge	7
quality management	quality assurance procedures	knowledge	7
surveillance radars	surveillance radars	knowledge	7
team building	team building	knowledge	7
tie	scaffolding components	knowledge	7
unmanned aircraft system	unmanned air systems	knowledge	7
camouflage	camouflage	knowledge	6
clean	conduct cleaning tasks	skill/competence	6
cognitive psychology	cognitive psychology	knowledge	6
colour	design principles	knowledge	6
computer technology	computer technology	knowledge	6
consultations	consultation	knowledge	6
crafting	crafting	knowledge	6
dust	perform dusting activities	skill/competence	6

Skill	Skill label on ESCO	Type	n
ecosystems	ecosystems	knowledge	6
information and communications technology	computer technology	knowledge	6
invocation	prayer	knowledge	6
lasers	electrooptic devices	knowledge	6
lasers	lasers	knowledge	6
lenses	optical components	knowledge	6
logging	logging	knowledge	6
persist	persist	skill/competence	6
photography	cinematography	knowledge	6
photography	photography	knowledge	6
political science	political science	knowledge	6
schematics	blueprints	knowledge	6
shade	design principles	knowledge	6
signing	fingerspelling	knowledge	6
stats	statistics	knowledge	6
warnings	contraindications	knowledge	6
be organized	work in an organised manner	skill/competence	5
chip	integrated circuits	knowledge	5
data privacy	data protection	knowledge	5
data storage	data storage	knowledge	5
demolition	demolish structures	skill/competence	5
design architecture	architectural design	knowledge	5
electricity	electricity	knowledge	5
endure	persist	skill/competence	5
feathers	bristles	knowledge	5
geographic areas	geographic areas	knowledge	5
greek	Greek	knowledge	5
hebrew	Hebrew	knowledge	5
infrared sensors	infrared sensors	knowledge	5
javascript	JavaScript	knowledge	5
job market	labour market	knowledge	5
joint venture	joint ventures	knowledge	5
norwegian	Norwegian	knowledge	5
php	PHP	knowledge	5
preventive medicine	preventive medicine	knowledge	5
provide guidance	provide leadership	skill/competence	5
sampling	collect samples	skill/competence	5
sampling	perform sample testing	skill/competence	5
security requirements	security regulations	knowledge	5
shooting	cinematography	knowledge	5
shooting	photography	knowledge	5
smart machines	mechatronics	knowledge	5
social sciences	social sciences	knowledge	5
software design	computer engineering	knowledge	5

Skill	Skill label on ESCO	Type	n
sounds	acoustics	knowledge	5
spark	SPARK	knowledge	5
support staff	guide staff	skill/competence	5
tactical planning	strategic planning	knowledge	5
alarms	alarm systems	knowledge	4
banking	economics	knowledge	4
be organised	work in an organised manner	skill/competence	4
big data analysis	analyse big data	skill/competence	4
biology	biology	knowledge	4
blueprints	blueprints	knowledge	4
business models	business model	knowledge	4
chips	microprocessors	knowledge	4
collection requirements management	collection management	knowledge	4
conflict management	conflict management	knowledge	4
data models	data models	knowledge	4
data security	apply information security policies	skill/competence	4
deal with uncertainty	deal with uncertainty	skill/competence	4
decision support systems	decision support systems	knowledge	4
electronic components	electronic components	knowledge	4
electronic components	electronics	knowledge	4
energies	energy	knowledge	4
estonian	Estonian	knowledge	4
fiction	literature	knowledge	4
first aid	first aid	knowledge	4
first aid	first response	knowledge	4
grammar	grammar	knowledge	4
ground segment	ground segment	knowledge	4
hearing	acoustics	knowledge	4
honour	morality	knowledge	4
informatics	computer science	knowledge	4
intensive care	intensive care medicine	knowledge	4
logistics management	manage logistics	skill/competence	4
maintenance, repair and overhaul	maintenance and repair	knowledge	4
management processes	management department processes	knowledge	4
market research	market analysis	knowledge	4
market research	market research	knowledge	4
mathematics	mathematics	knowledge	4
medicines	medicines	knowledge	4
military coordination	military logistics	knowledge	4
mysql	MySQL	knowledge	4
operate system	administer ICT system	skill/competence	4
oxygen	basic chemicals	knowledge	4
persian	Persian	knowledge	4

Skill	Skill label on ESCO	Type	n
personnel management	personnel management	knowledge	4
persuade	persuade others	skill/competence	4
protect data	apply information security policies	skill/competence	4
pyrotechnics	explosives	knowledge	4
rehabilitation	rehabilitation	knowledge	4
research methodology	scientific research methodology	knowledge	4
signal processing	signal processing	knowledge	4
spiral development	Spiral development	knowledge	4
sql	SQL	knowledge	4
supply chain management	analyse supply chain strategies	skill/competence	4
supply chain management	manage supplies	skill/competence	4
supply chain management	supply chain management	knowledge	4
take decisions	make decisions	skill/competence	4
task management	manage schedule of tasks	skill/competence	4
training plan	periodisation	knowledge	4
ukrainian	Ukrainian	knowledge	4
visual flight rules	visual flight rules	knowledge	4
warehouse	perform warehousing operations	skill/competence	4
algorithmic	algorithms	knowledge	3
bosnian	Bosnian	knowledge	3
brands	trademarks	knowledge	3
business model	business model	knowledge	3
cfd	computational fluid dynamics	knowledge	3
chemistry	chemistry	knowledge	3
data mining	data mining	knowledge	3
database systems	database management systems	knowledge	3
dismantling	decommissioning	knowledge	3
electrical engineering	electrical engineering	knowledge	3
electronic equipment	electronics	knowledge	3
electronic information	electronic communication	knowledge	3
embedded systems	embedded systems	knowledge	3
firmware	firmware	knowledge	3
first responder	first response	knowledge	3
geographic regions	geographic areas	knowledge	3
geosynchronous satellites	geostationary satellites	knowledge	3
give advice	give advice to others	skill/competence	3
help individuals	guide others	skill/competence	3
help individuals	mentor individuals	skill/competence	3
human-computer interaction	human-computer interaction	knowledge	3
interact with others	interact with others	skill/competence	3
international trade	international trade	knowledge	3
irish	Irish	skill/competence	3
iron	iron textiles	skill/competence	3
kurdish	Kurdish	knowledge	3

Skill	Skill label on ESCO	Type	n
lexicon	terminology	knowledge	3
medical equipment	medical furniture	knowledge	3
meteorology	meteorology	knowledge	3
microelectronics	microelectronics	knowledge	3
military aviation	military aviation	knowledge	3
military code	military code	knowledge	3
natural language processing	natural language processing	knowledge	3
oceanography	oceanography	knowledge	3
optical systems	optomechanical engineering	knowledge	3
organisational structure	organisational structure	knowledge	3
photogrammetry	photogrammetry	knowledge	3
process control	control engineering	knowledge	3
process control	perform process control in the wearing apparel industry	skill/competence	3
processing information	process qualitative information	skill/competence	3
providing information	provide information	skill/competence	3
range of sensors	sensors	knowledge	3
receive feedback	manage feedback	skill/competence	3
rhetoric	rhetoric	knowledge	3
rules of the road	road traffic laws	knowledge	3
sands	various types of sand	knowledge	3
security systems	building systems monitoring technology	knowledge	3
self-awareness	reflexion	knowledge	3
speech recognition	speech recognition	knowledge	3
strategic plans	strategic planning	knowledge	3
syntax	grammar	knowledge	3
systems thinking	systems thinking	knowledge	3
a business process	business processes	knowledge	2
agile development	Agile development	knowledge	2
air force operations	air force operations	knowledge	2
air traffic management	air traffic management	knowledge	2
apl	APL	knowledge	2
ask questions	use questioning techniques	skill/competence	2
assess information	evaluate information	skill/competence	2
assessment processes	assessment processes	knowledge	2
astronomy	astronomy	knowledge	2
atomic energy	nuclear energy	knowledge	2
automation technologies	automation technology	knowledge	2
bacteria	pathogenic microorganisms	knowledge	2
biotechnology	biotechnology	knowledge	2
body language	body language	knowledge	2
carry on	persist	skill/competence	2
casts	dies	knowledge	2
caveats	contraindications	knowledge	2
circuit schematic	electrical wiring diagrams	knowledge	2

Skill	Skill label on ESCO	Type	n
cloud technologies	cloud technologies	knowledge	2
coining	coining	knowledge	2
customer service	customer service	knowledge	2
decompression	cope with decompression	skill/competence	2
demography	demography	knowledge	2
digital signal processing	signal processing	knowledge	2
electro-optics	electrooptics	knowledge	2
emergency assistance	first aid	knowledge	2
fisheries	fishing industry	knowledge	2
formulas	algorithms	knowledge	2
gambling	betting	knowledge	2
gather data	gather data	skill/competence	2
gather data	manage quantitative data	skill/competence	2
geodesy	geodesy	knowledge	2
government policy	government policy	knowledge	2
hadoop	Hadoop	knowledge	2
hardware components	hardware components	knowledge	2
harnesses	climbing equipment	knowledge	2
helmet	diving equipment	knowledge	2
help people	mentor individuals	skill/competence	2
hydraulic fluid	hydraulic fluid	knowledge	2
identify opportunities	identify opportunities	skill/competence	2
identify problems	troubleshoot	skill/competence	2
instrument flight rules	visual flight rules	knowledge	2
islam	Islam	knowledge	2
job opportunities	job market offers	knowledge	2
joint ventures	joint ventures	knowledge	2
korean	Korean	knowledge	2
leadership principles	leadership principles	knowledge	2
locks	hair	knowledge	2
locks	locking mechanisms	knowledge	2
maintenance and repair	maintenance and repair	knowledge	2
manage data	manage data	skill/competence	2
management of resources	manage resources	skill/competence	2
mechanical engineering	mechanical engineering	knowledge	2
motherboard	security panels	knowledge	2
nosql	NoSQL	knowledge	2
portuguese	Portuguese	knowledge	2
process data	manage quantitative data	skill/competence	2
process data	process data	skill/competence	2
public law	public law	knowledge	2
publishing company	publishing industry	knowledge	2
pumps	manufacturing plant equipment	knowledge	2
radiobiology	radiobiology	knowledge	2

Skill	Skill label on ESCO	Type	n
read article	read articles	skill/competence	2
reclamation	repossession	knowledge	2
record information	document evidence	skill/competence	2
regulatory requirements	good laboratory practice	knowledge	2
reproduction	reprography	knowledge	2
rules of the game	games rules	knowledge	2
security standards	security regulations	knowledge	2
set priorities	manage time	skill/competence	2
social science	social sciences	knowledge	2
spawning	aquaculture reproduction	knowledge	2
staff support	support ICT system users	skill/competence	2
statistical analysis	statistics	knowledge	2
strategic thinking	develop strategy to solve problems	skill/competence	2
support individuals	guide others	skill/competence	2
support individuals	mentor individuals	skill/competence	2
support people	mentor individuals	skill/competence	2
surveying	surveying	knowledge	2
system control	control systems	knowledge	2
systems theory	systems theory	knowledge	2
team working	work as a team	skill/competence	2
transmission technology	transmission technology	knowledge	2
transportation engineering	transportation engineering	knowledge	2
understand the context	perceive the context	skill/competence	2
use of data	statistics	knowledge	2
vietnamese	Vietnamese	knowledge	2
view scenes	watch scenes	skill/competence	2
voltage	electricity principles	knowledge	2
wildlife	wildlife	knowledge	2
abstracts	make abstracts	skill/competence	1
adapt to change	adapt to change	skill/competence	1
adapt to changes	adapt to change	skill/competence	1
advanced manufacturing	apply advanced manufacturing	skill/competence	1
aerodynamics	aerodynamics	knowledge	1
air traffic control operations	air traffic control operations	knowledge	1
ajax	AJAX	knowledge	1
algebra	algebra	knowledge	1
algebra	geometry	knowledge	1
analytical work	work analytically	skill/competence	1
anthropology	anthropology	knowledge	1
anthropology	study human societies	skill/competence	1
anticipate problems	anticipate potential deficiencies	skill/competence	1
application programming	ICT system programming	knowledge	1
architectural design	architectural design	knowledge	1
architecture standards	architecture regulations	knowledge	1

Skill	Skill label on ESCO	Type	n
assembling robots	assemble robots	skill/competence	1
assertiveness	Assertiveness	knowledge	1
assess data	inspect data	skill/competence	1
assessment practices	assessment processes	knowledge	1
assist customers	assist customers	skill/competence	1
assist customers	communicate with customers	skill/competence	1
bargaining	negotiate compromise	skill/competence	1
basque	Basque	knowledge	1
be reliable	act reliably	skill/competence	1
behavioural science	behavioural science	knowledge	1
betting	betting	knowledge	1
biosecurity	biosecurity	knowledge	1
blackberry	BlackBerry	knowledge	1
breaking up	decommissioning	knowledge	1
build a set	model sets	skill/competence	1
building codes	building codes	knowledge	1
building machines	assemble machines	skill/competence	1
business intelligence	business intelligence	knowledge	1
business investment	business loans	knowledge	1
business process modelling	business process modelling	knowledge	1
cargo handling	handle cargo	skill/competence	1
cartography	cartography	knowledge	1
categories of vehicles	types of vehicles	knowledge	1
circulate information	circulate information	skill/competence	1
civil engineering	civil engineering	knowledge	1
clay	materials used in stoneware manufacturing	knowledge	1
climatology	climatology	knowledge	1
collection management software	collection management software	knowledge	1
commercial law	commercial law	knowledge	1
communicable diseases	communicable diseases	knowledge	1
company policy	company policies	knowledge	1
composite materials	composite materials	knowledge	1
computer equipment	computer equipment	knowledge	1
computer literacy	have computer literacy	skill/competence	1
conducting studies	perform studies and field investigation	skill/competence	1
confiscation	repossession	knowledge	1
conflict resolution	conflict management	knowledge	1
constructing products	construction products	knowledge	1
consumer electronics	consumer electronics	knowledge	1
contract management	manage contracts	skill/competence	1
control devices	control systems	knowledge	1
control equipment	maintain equipment	skill/competence	1
control segment	ground segment	knowledge	1
convince others	persuade others	skill/competence	1

Skill	Skill label on ESCO	Type	n
cost management	cost management	knowledge	1
counselling	give advice to others	skill/competence	1
craftsmanship	craftsmanship	knowledge	1
criminal law	criminal law	knowledge	1
crisis intervention	crisis intervention	knowledge	1
crisis interventions	crisis intervention	knowledge	1
cultural history	cultural history	knowledge	1
data quality assessment	data quality assessment	knowledge	1
deal with problems	troubleshoot	skill/competence	1
decision support matrix	decision support systems	knowledge	1
decision support software	decision support systems	knowledge	1
decommissioning	decommissioning	knowledge	1
delegate tasks	delegate activities	skill/competence	1
demining operations	demining operations	knowledge	1
design model	create model	skill/competence	1
develop a model	develop models	skill/competence	1
develop educational materials	develop digital educational materials	skill/competence	1
develop objectives	develop strategy to solve problems	skill/competence	1
develop rules	draft legislation	skill/competence	1
develop staff	develop staff	skill/competence	1
developing new products	develop new products	skill/competence	1
devops	DevOps	knowledge	1
digital camera	cameras	knowledge	1
direct subordinates	supervise work	skill/competence	1
disaster recovery	implement ICT recovery system	skill/competence	1
distillation	vacuum distillation processes	knowledge	1
distributed computing	distributed computing	knowledge	1
document management	document management	knowledge	1
drainage	rainwater management	knowledge	1
driving vehicles	drive vehicles	skill/competence	1
e-learning	e-learning	knowledge	1
earth science	Earth science	knowledge	1
earth science	geology	knowledge	1
ecology	ecology	knowledge	1
efficiently work	work efficiently	skill/competence	1
electronic communications	electronic communication	knowledge	1
electronic devices	electronic components	knowledge	1
electronic devices	electronics	knowledge	1
emergency surgery	emergency surgery	knowledge	1
encourage others	motivate others	skill/competence	1
entomology	entomology	knowledge	1
entrepreneurship	entrepreneurship	knowledge	1
environmental impact assessment	assess environmental impact	skill/competence	1
environmental threats	environmental threats	knowledge	1

Skill	Skill label on ESCO	Type	n
equipment maintenance	maintain equipment	skill/competence	1
equipment maintenance	perform minor repairs to equipment	skill/competence	1
ethnolinguistics	ethnolinguistics	knowledge	1
extinguishing fires	extinguish fires	skill/competence	1
family assistance	family therapy	knowledge	1
fertilizers	agricultural chemicals	knowledge	1
fiber optics	fibre optics	knowledge	1
field of cybernetics	cybernetics	knowledge	1
financial data	economics	knowledge	1
financial market	financial markets	knowledge	1
financial market	stock market	knowledge	1
find people	trace people	skill/competence	1
first response	first response	knowledge	1
football	football	knowledge	1
formulae	algorithms	knowledge	1
gems	gemstones	knowledge	1
generators	electrical machines	knowledge	1
genetics	genetics	knowledge	1
geographical areas	geographic areas	knowledge	1
geomatics	geomatics	knowledge	1
give first aid	initiate life preserving measures	skill/competence	1
give first aid	provide first aid	skill/competence	1
global maritime distress and safety system	Global Maritime Distress and Safety System	knowledge	1
global navigation satellite system	global navigation satellite system performance parameters	knowledge	1
global positioning systems	geographic information systems	knowledge	1
graphic design	graphic design	knowledge	1
hair	hair	knowledge	1
hand signals	hand gestures	knowledge	1
handle crisis situations	deal with unforeseen incidents in hospitality	skill/competence	1
hardware business	hardware industry	knowledge	1
hardware design	design hardware	skill/competence	1
hardware platforms	hardware platforms	knowledge	1
hazardous waste	characteristics of waste	knowledge	1
health and safety in the workplace	health and safety in the workplace	knowledge	1
health care system	health care system	knowledge	1
help customers	advise customers	skill/competence	1
help customers	assist customers	skill/competence	1
help customers	communicate with customers	skill/competence	1
help students	tutor students	skill/competence	1
historical systems	historical methods	knowledge	1
hopper	blow moulding machine parts	knowledge	1
human resource management	human resource management	knowledge	1

Skill	Skill label on ESCO	Type	n
human resources management	human resource management	knowledge	1
hungarian	Hungarian	knowledge	1
identify patterns	process qualitative information	skill/competence	1
identify talent	identify talent	skill/competence	1
identify training needs	identify training needs	skill/competence	1
immunodeficiency	clinical immunology	knowledge	1
improve processes	improve business processes	skill/competence	1
improve the service	focus on service	skill/competence	1
infectious diseases	communicable diseases	knowledge	1
information extraction	information extraction	knowledge	1
information structure	information structure	knowledge	1
integrated circuits	integrated circuits	knowledge	1
integrated circuits	semiconductors	knowledge	1
interacting with others	interact with others	skill/competence	1
interaction design	software interaction design	knowledge	1
intermodal systems	intermodal options	knowledge	1
international commerce	international trade	knowledge	1
international convention for the prevention of pollution from ships	International Convention for the Prevention of Pollution from Ships	knowledge	1
international regulation	international law	knowledge	1
ios	iOS	knowledge	1
jewels	gemstones	knowledge	1
journalist	journalism	knowledge	1
laws of physics	physics	knowledge	1
learning technologies	learning technologies	knowledge	1
legal terms	legal terminology	knowledge	1
lithuanian	Lithuanian	knowledge	1
livestock	livestock	knowledge	1
maintaining ground	maintain ground	skill/competence	1
maintenance of equipment	maintain equipment	skill/competence	1
maintenance of equipment	perform minor repairs to equipment	skill/competence	1
make-up	cosmetics	knowledge	1
make bets	place bets	skill/competence	1
make decision	make decisions	skill/competence	1
make risk assessment	draw up risk assessment	skill/competence	1
manage equipment	maintain equipment	skill/competence	1
manage health and safety	manage health and safety	skill/competence	1
manage test	manage tests	skill/competence	1
manage uncertainty	deal with uncertainty	skill/competence	1
management of airspace	air traffic management	knowledge	1
managing resources	manage resources	skill/competence	1
marksmanship	marksmanship	knowledge	1
massage	give massages	skill/competence	1

Skill	Skill label on ESCO	Type	n
measurement of radiation	dosimetric planning	knowledge	1
media types	media formats	knowledge	1
media types	types of media	knowledge	1
meet a deadline	meet deadlines	skill/competence	1
microchip	integrated circuits	knowledge	1
microchips	microelectronics	knowledge	1
microchips	microprocessors	knowledge	1
military logistics	military logistics	knowledge	1
military manoeuvres	military drill	knowledge	1
military weapons	military weaponry	knowledge	1
mold	blow moulding machine parts	knowledge	1
multimedia system	multimedia systems	knowledge	1
music theory	musical notation	knowledge	1
music theory	musical theory	knowledge	1
nano-technology	nanotechnology	knowledge	1
nanotechnology	nanotechnology	knowledge	1
national environmental policy	environmental policy	knowledge	1
nuclear energy	nuclear energy	knowledge	1
nuclear power	nuclear energy	knowledge	1
obesity	obesity	knowledge	1
obtain funding	find grants	skill/competence	1
office equipment	office equipment	knowledge	1
office software	office software	knowledge	1
oil products	petroleum	knowledge	1
operational resilience	organisational resilience	knowledge	1
optical fibers	fibre optics	knowledge	1
organisational structures	organisational structure	knowledge	1
packing	packaging engineering	knowledge	1
parallel computing	use concurrent programming	skill/competence	1
pedagogy	pedagogy	knowledge	1
perl	Perl	knowledge	1
persevere	persist	skill/competence	1
persisting	persist	skill/competence	1
personal protection equipment	personal protective equipment	knowledge	1
pesticides	agricultural chemicals	knowledge	1
pesticides	pesticides	knowledge	1
philosophies	philosophical schools of thought	knowledge	1
photonics	photonics	knowledge	1
plan time	manage time	skill/competence	1
pole	scaffolding components	knowledge	1
polish	Polish	knowledge	1
political system	political ideologies	knowledge	1
primary care	primary care	knowledge	1
principles of communication	communication principles	knowledge	1

Skill	Skill label on ESCO	Type	n
probability theory	probability theory	knowledge	1
processing of data	process data	skill/competence	1
programme management	project management	knowledge	1
propose new strategies	provide improvement strategies	skill/competence	1
protect information	apply information security policies	skill/competence	1
protection of data	data protection	knowledge	1
provide access to information	facilitate access to information	skill/competence	1
provide leadership	provide leadership	skill/competence	1
psychological concepts	psychological concepts	knowledge	1
public relations	public relations	knowledge	1
purification	chemical processes	knowledge	1
quality standards	quality standards	knowledge	1
radio spectrum	electromagnetic spectrum	knowledge	1
radioactive contamination	radioactive contamination	knowledge	1
reconstruct	reverse engineering	knowledge	1
remain focused	stay alert	skill/competence	1
removing contaminants	remove contaminants	skill/competence	1
reserve cargo	book cargo	skill/competence	1
resources management	manage resources	skill/competence	1
responding to emergencies	manage emergency procedures	skill/competence	1
resuscitation	resuscitation	knowledge	1
risk governance	risk management	knowledge	1
ropes	climbing equipment	knowledge	1
run simulations	run simulations	skill/competence	1
scientific models	scientific modelling	knowledge	1
search engine	search engines	knowledge	1
search engines	search engines	knowledge	1
secure working area	secure working area	skill/competence	1
securities	securities	knowledge	1
security risks	security threats	knowledge	1
security threat	security threats	knowledge	1
security threats	security threats	knowledge	1
set goals	develop strategy to solve problems	skill/competence	1
set targets	develop strategy to solve problems	skill/competence	1
shift priorities	adjust priorities	skill/competence	1
show concern for others	demonstrate consideration	skill/competence	1
show interest	demonstrate curiosity	skill/competence	1
small craft operating	operate small craft	skill/competence	1
smelling	olfaction	knowledge	1
social justice	social justice	knowledge	1
social science studies	social sciences	knowledge	1
sociology	sociology	knowledge	1
solar cells	optoelectronic devices	knowledge	1
solid-state lasers	lasers	knowledge	1

Skill	Skill label on ESCO	Type	n
staff supervision	supervise staff	skill/competence	1
stay with	keep company	skill/competence	1
stock market	stock market	knowledge	1
stripping	aquaculture reproduction	knowledge	1
subsidiary operations	subsidiary operations	knowledge	1
surgery	surgery	knowledge	1
team development	team building	knowledge	1
technical consulting	provide technical expertise	skill/competence	1
tennis	tennis	knowledge	1
theory of probability	probability theory	knowledge	1
think critically	use logical reasoning	skill/competence	1
threats to security	security threats	knowledge	1
tqm	total quality control	knowledge	1
transplantation	transplantation	knowledge	1
turkish	Turkish	knowledge	1
tutoring	instruct others	skill/competence	1
type of aircraft	types of aircraft	knowledge	1
types of ships	types of maritime vessels	knowledge	1
types of vehicle	types of vehicles	knowledge	1
types of vehicles	types of vehicles	knowledge	1
typology	typology	knowledge	1
undertake campaigns	develop campaigns	skill/competence	1
use information technology	use IT tools	skill/competence	1
verify information	evaluate information	skill/competence	1
video camera	cameras	knowledge	1
viruses	pathogenic microorganisms	knowledge	1
weather forecasting	meteorology	knowledge	1
welding	join metals	skill/competence	1
welding	operate welding equipment	skill/competence	1
wiring diagrams	electrical wiring diagrams	knowledge	1
wordpress	WordPress	knowledge	1
work as a team	work as a team	skill/competence	1
work autonomously	work independently	skill/competence	1
work efficiently	work efficiently	skill/competence	1
work independently	work independently	skill/competence	1
working independently	work independently	skill/competence	1

Table 15 - Completed list of skills extracted from the C4ISTAR documents using the ESCO database.

The completed list of the entries extracted using O*NET repositories are shown in table 7. The table 7 contains for each skill:

- the type of skill classified from O*NET;
- the number of occurrences (n) in the C4ISTAR documents collection, as explained in appendix 3.

Skill	Type	n
design	knowledge	1338
coordination	cross-functional skills	378
science	basic skills	286
monitoring	basic skills	186
transportation	knowledge	161
installation	cross-functional skills	88
visualization	abilities	84
telecommunications	knowledge	58
writing	basic skills	38
programming	cross-functional skills	37
psychology	knowledge	34
mechanical	knowledge	25
geography	knowledge	20
speaking	basic skills	17
english language	knowledge	13
negotiation	cross-functional skills	12
physics	knowledge	12
systems analysis	cross-functional skills	9
night vision	abilities	8
reaction time	abilities	8
biology	knowledge	6
foreign language	knowledge	4
mathematics	basic skills	4
mathematics	knowledge	4
stamina	abilities	4
chemistry	knowledge	3
critical thinking	basic skills	3
speech recognition	abilities	3
administration and management	knowledge	2
equipment maintenance	cross-functional skills	2
persuasion	cross-functional skills	2
clerical	knowledge	1
communications and media	knowledge	1
deductive reasoning	abilities	1
dynamic flexibility	abilities	1
dynamic strength	abilities	1
engineering and technology	knowledge	1
explosive strength	abilities	1
extent flexibility	abilities	1
instructing	cross-functional skills	1
operations analysis	cross-functional skills	1
originality	abilities	1
personnel and human resources	knowledge	1
rate control	abilities	1

Skill	Type	n
repairing	cross-functional skills	1
static strength	abilities	1
systems evaluation	cross-functional skills	1
time sharing	abilities	1
trunk strength	abilities	1

*Table 16 - Completed list of skills extracted from the C4ISTAR documents using the O*NET database.*

The list of skills extracted from the C4ISTAR collection of documents are manually parsed to understand whether a skill could be considered as a transversal skill and which are the most relevant skills for the C4ISTAR domain according to the current landscape in the C4ISTAR, as described in the paragraph 1 "Current state". Finally, the selected transversal skills are manually analysed in the sentence context of the C4ISTAR documents to understand whether the extracted entity is a skill or not. The process is better explained in the following paragraph "Precision of the extraction process for Transversal Skills".

Precision of the extraction process for Transversal Skills

The extracted and selected entities may indicate also a technical specification of a technological systems, therefore a manual examination is useful to measure the precision of the extraction process, described in the Appendix 3 "Gazetteer-based NER". The analysis is a review of all sentences of transversal skill extracted from the C4ISTAR collection of documents. The precision for skills is calculated using the formula:

$$Precision = \frac{TP}{TP + FP}$$

where TP is the True Positive value or rather the extracted entities which the research team identified as skills and FP is the False Positive value or rather the extracted entities which the algorithm considers as skills, but which are not such. Table 11 reports for each skill the precision of the extraction process.

Skill	Source	Number of occurrence in sentence of C4ISTAR docs	Number of times the record is a skill	Precision
help people	ESCO	2	1	50%
operational resilience	ESCO	1	1	100%
persuade	ESCO	4	1	25%
provide leadership	ESCO	1	1	100%
remain focused	ESCO	1	1	100%
solve problems	ESCO	5	5	100%
tactical planning	ESCO	5	5	100%
team working	ESCO	3	3	100%

think critically	ESCO	1	1	100%
negotiation	ONET	12	7	58%

Table 17 - Results of precision of the transversal skill

Defence-related skills

The defence-related skills are collected with a twofold approach, as described in the paragraph 2.2 "Identify skills". The skill related with the National or International standard that a worker should be known to operate with the C4ISTAR systems are reported in the table 8. On the other hand, the tables 9 and 10 show the extracted non-functional requirements related with the C4ISTAR systems using respectively the gazetteer-based and rule-based approach. The collection of the C4ISTAR documents is an input for the extraction process as described in more details in the appendix 3 "Gazetteer-based NER" and 4 "Rule-based NER". Tables 8, 9 and 10 show also the number of occurrences in the C4ISTAR collection per entity.

Standard	n		Standard	n
stanag 4607	3		stanag 4082	1
stanag 4609	3		stanag 4119	1
stanag 4545	2		stanag 4406	1
stanag 5527	2		stanag 4559	1
stanag 5602	2		stanag 4586	1
stanag 2019	1		stanag 5500	1
stanag 3596	1		stanag 5525	1
stanag 3809	1		stanag 7149	1

Table 18 - Completed list of defence-related skills extracted from the C4ISTAR documents using the list of standard agreement of the Nato.

Non-functional requirementes	Label	n		Non-functional requirementes	Label	n
capabilities	Capability	1456		compatibility	Compatibility	19
security	Security	1200		transparency	Transparency	19
capability	Capability	951		capacities	Capacity	12
interoperability	Interoperability	699		affordability	Affordability	11
effectiveness	Effectiveness	590		efficiencies	Efficiency	11
capacity	Capacity	399		maintainability	Maintainability	8
efficiency	Efficiency	322		fault tolerance	Fault tolerance	7
safety	Safety	253		scalability	Scalability	7
availability	Availability	186		portability	Portability	6
resilience	Resilience	146		operability	Operability	5
stability	Stability	112		durability	Durability	4
adaptability	Adaptability	100		maneuverability	Maneuverability	3
readiness	Readiness	100		supportability	Supportability	3
compliance	Compliance	98		modifiability	Modifiability	2
reliability	Reliability	56		auditability	Auditability	1

robustness	Robustness	46		availabilities	Availability	1
vulnerabilities	Vulnerability	44		disaster recovery	Disaster recovery	1
vulnerability	Vulnerability	40		failure management	Failure management	1
accessibility	Accessibility	36		securities	Security	1
usability	Usability	36		susceptibility	Susceptibility	1
survivability	Survivability	31				

Table 19 - Completed list of defence-related skills extracted from the C4ISTAR documents using the list of non-functional requirements.

Non-functional requirementes	n	Non-functional requirementes	n	Non-functional requirementes	n	Non-functional requirementes	n	Non-functional requirementes	n
agility	3131	masculinity	33	densities	4	rationality	2	incompatibilities	1
capabilities	1456	necessity	31	durability	4	recognizability	2	incredulity	1
security	1200	survivability	31	fragility	4	recoverability	2	individuality	1
quality	1099	sustainability	30	hostilities	4	repeatability	2	inequality	1
maturity	969	productivity	29	identities	4	rity	2	infinity	1
capability	951	sensitivity	29	ingenuity	4	serviceability	2	infirmity	1
entity	895	universality	29	liability	4	sibility	2	inflexibility	1
ability	802	equivocality	28	linearity	4	solidarity	2	informaquality	1
entities	752	predictability	27	maintainability	4	solidity	2	insensitivity	1
complexity	735	realities	25	modality	4	tivity	2	inseparability	1
interoperability	699	confidentiality	24	ntities	4	totality	2	intangibility	1
activities	575	criticality	24	scarcity	4	transportability	2	intentionality	1
authority	482	credibility	22	sensitivities	4	turity	2	interactivity	1
responsibility	450	granularity	22	ubiquity	4	unreliability	2	inviolability	1
capacity	399	velocity	22	understandability	4	volatility	2	ities	1
activity	353	probabilities	21	flexibility	3	132capabilities	1	legality	1
flexibility	312	applicability	19	affordability	3	20maturity	1	liabilities	1
connectivity	237	compatibility	19	brevity	3	2fcommunity	1	likeauthority	1
community	232	quantities	19	composability	3	adaptibility	1	lity	1
opportunity	203	severity	19	curiosity	3	affinity	1	localities	1
opportunities	191	proximity	18	discontinuities	3	agilities	1	lowintensity	1
availability	186	complexities	17	discontinuity	3	animosity	1	lowmobility	1
responsibilities	176	reactivity	17	employability	3	anonymity	1	manoeuvrability	1
university	173	selectivity	17	generosity	3	audacity	1	megacities	1
reality	169	fidelity	16	gility	3	auditability	1	mentality	1
priority	164	instability	16	globalsecurity	3	authorinity	1	merchantability	1
cybersecurity	151	vicinity	16	impossibility	3	authorityresponsibility	1	minority	1
quantity	149	variability	14	longevity	3	availabilities	1	moffat_complexity	1
ambiguity	147	heterogeneity	13	maneuverability	3	availablity	1	mortality	1
propensity	144	lethality	13	nationalities	3	biosecurity	1	multidimensionality	1
probability	143	similarities	13	neutrality	3	calamities	1	municipalities	1
mobility	142	capacities	12	propensities	3	calamity	1	munities	1
facilities	139	density	12	seniority	3	causalities	1	munity	1
authorities	130	trafficability	12	sociability	3	cavities	1	noconnectivity	1

Non-functional requirementes	n	Non-functional requirementes	n	Non-functional requirementes	n	Non-functional requirementes	n	Non-functional requirementes	n
priorities	123	affordability	11	specificities	3	charity	1	nonlinearity	1
stability	112	commodity	11	subsidiarity	3	cirity	1	nonproportionality	1
cooperability	109	utilities	11	supportability	3	commmunities	1	obesity	1
facility	107	cities	10	tities	3	conquality	1	obscurity	1
adaptability	100	dimensionality	10	unfamiliarity	3	contiguity	1	omplexity	1
continuity	99	locality	10	accountabilities	2	crecreativity	1	operationscapability	1
superiority	99	believability	9	adversity	2	criminality	1	originality	1
utility	94	gravity	9	ativity	2	ctivity	1	pabilities	1
versatility	89	ity	9	atrocities	2	decomposability	1	paucity	1
unity	86	objectivity	9	atrocity	2	deniability	1	peractivity	1
validity	79	practicality	9	austerity	2	desirability	1	permeability	1
diversity	77	specificity	9	automaticity	2	dictionentity	1	personuniversity	1
inability	76	traceability	9	bility	2	disabilities	1	plexity	1
possibilities	76	universities	9	cardinality	2	disparities	1	popularity	1
clarity	73	equality	8	commodities	2	disparity	1	posterity	1
functionality	73	humidity	8	commonalities	2	disutility	1	potentialities	1
possibility	69	sharability	8	comparability	2	duality	1	potentiality	1
familiarity	64	adaptivity	7	complementarity	2	dysfunctionalities	1	privity	1
communities	61	authenticity	7	countermobility	2	enginuity	1	processcreativity	1
feasibility	61	commonality	7	cyber_space_security	2	enormity	1	proclivities	1
integrity	60	eventuality	7	eligibility	2	equities	1	profundity	1
personality	60	functionalities	7	exclusivity	2	eventualities	1	projectability	1
reliability	56	scalability	7	fatalities	2	exibility	1	publicity	1
qualities	54	simplicity	7	fluidity	2	ferocity	1	recuperability	1
impulsivity	50	unpredictability	7	humanity	2	festivities	1	regularity	1
reflectivity	49	viability	7	impunity	2	formality	1	reprogrammability	1
abilities	48	deployability	6	incapability	2	fraternity	1	reversibility	1
homogeneity	48	multiplicity	6	insecurity	2	futility	1	securities	1
centrality	47	normality	6	instabilities	2	gatherquality	1	shareability	1
identity	44	portability	6	intensities	2	generalizability	1	similarity	1
rigidity	44	suitability	6	interconnectivity	2	gilcommunity	1	simultaneity	1
vulnerabilities	44	acceptability	5	interentity	2	heterogenuity	1	sincerity	1
intensity	41	electricity	5	interpretability	2	higherfidelity	1	special_operations_capability	1
accountability	40	fatality	5	invulnerability	2	highintensity	1	susceptibility	1
creativity	40	modularity	5	modalities	2	highquality	1	synchronicity	1
vulnerability	40	nationality	5	modifiability	2	humility	1	systemcapability	1
majority	39	operability	5	nteroperability	2	illuscapability	1	timidity	1
city	37	parity	5	oddity	2	immaturity	1	tity	1
visibility	37	personalities	5	pability	2	immorality	1	transferability	1
accessibility	36	receptivity	5	peculiarities	2	impartiality	1	tunity	1
usability	36	uniformity	5	plurality	2	inaccessibility	1	univerisity	1
conformity	35	veracity	5	proportionality	2	inactivity	1	unsuitability	1
femininity	33	centricity	4	prosperity	2	incaresponsibility	1	vitality	1

Table 20 - Completed list of defence-related skills extracted from the C4ISTAR documents using the rule for extracting the non-functional requirements.

The selection of the defence-related skills is based on a twofold approach:

- an expert judgment, as described in the paragraph 2.2 “Identify skills”;
- an automatic process based on the distribution frequency of the selected entities. In particular, the defence-related skills with the highest number of the coverage C4ISTAR documents are selected.

Appendix 5. Labour market demand for the Robotics, AI and autonomous systems skills

The labour market demand is assessed taking into account the skills occurrence in job offers and the ABC method. The inflection points of the curve are used to divide the demand into Low, Medium and High, as presented in the Figure 2. The keywords reported in the Table 19 are applied to assess the skills occurrence in job offers. It should be noticed that Table 19 contains also transversal skills and their occurrence.

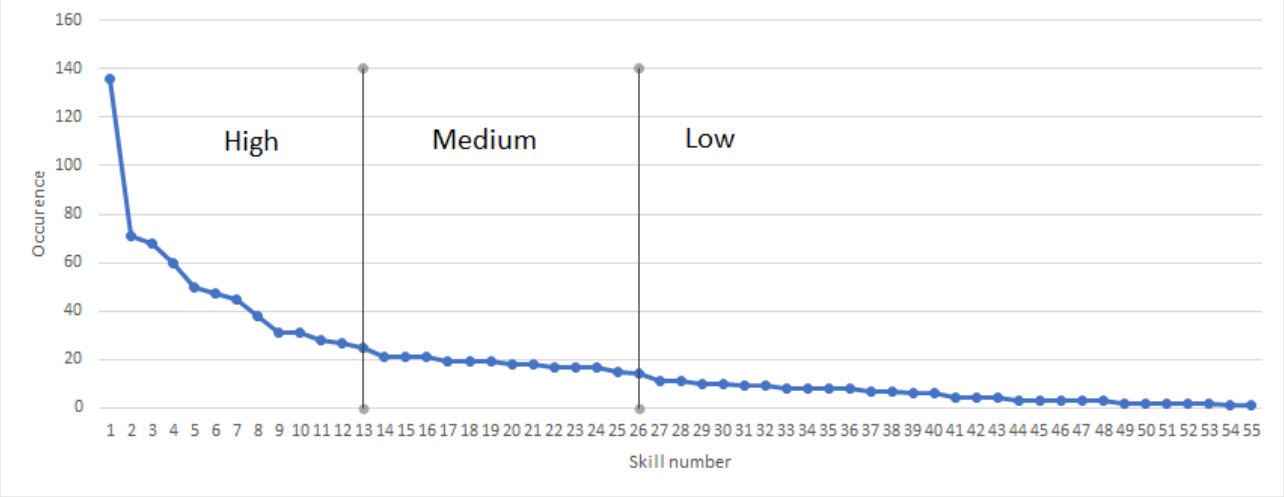

Figure 2 - ABC analysis with identification of the inflection points for labour market demand; skill number taken from Table 7.

Skill no	Skill	Demand from labour market	Occurrence	Keyword	Type
1	Work in teams	High	**136**	team	Transversal
2	Computer programming (Python, C, C++, R, Java, MATLAB, Lisp, Prolog)	High	**71**	Python, C, C++, R, Java, MATLAB, Lisp, Prolog	Technical
3	Routing, trajectory planning, optimisation, guidance and control	High	**68**	Routing, trajectory planning, optimisation, guidance, control	Defence related
4	Guidance, navigation and control	High	**60**	Guidance, navigation, control	Technical
5	Working with computers	High	**50**	computer	Technical
6	Control engineering	High	**47**	Control	Technical
7	Analytical thinking	High	**45**	Analytic	Transversal
8	Maintain operational communications	High	**38**	communications	Transversal
9	Create a product's virtual model	High	**31**	model	Technical
10	Develop models	High	**31**	model	Technical
11	Solving problems	High	**28**	Solving	Transversal
12	Cloud technologies	High	**27**	Cloud	Technical

With the support of the Erasmus+ Programme of the European Union

Skill no	Skill	Demand from labour market	Occurrence	Keyword	Type
13	Work in an international environment	High	**25**	international	Transversal
14	Agile project management	Medium	21	Agile, project management	Transversal
15	Using digital tools for processing sound and images	Medium	21	Image, sound	Technical
16	Utilise machine learning	Medium	21	machine learning	Technical
17	Algorithms	Medium	19	Algorithm	Technical
18	Integrate system components		19	Integration	Technical
19	Work in an organised manner	Medium	19	Organisation, Organisation	Transversal
20	Robot programming	Medium	18	Robot	Technical
21	Satellites	Medium	18	Satellite	Defence related
22	Maintain robotic equipment	Medium	17	Robotic	Technical
23	Robotic components	Medium	17	Robotic	Technical
24	Work independently	Medium	17	independent	Transversal
25	Run simulations	Medium	15	simulation	Technical
26	Scientific research methodology	Medium	14	research	Technical
27	Functional safety of control systems	Low	11	safety	Technical
28	Utilise deep learning	Low	11	deep learning	Technical
29	Apply 3D imaging techniques	Low	10	3D	Technical
30	Use CAD software	Low	10	CAD	Technical
31	Demonstrate willingness to learn	Low	9	learn	Transversal
32	Real-time computing	Low	9	Real-time	Technical
33	Adapt to change	Low	8	change	Transversal
34	Analyse big data	Low	8	big data	Technical
35	Model Based System Engineering	Low	8	System Engineering	Technical
36	Target tracking	Low	8	tracking	Defence related
37	Field-programmable gate arrays (FPGA)	Low	7	FPGA	Defence related
38	Radars	Low	7	Radar	Defence related
39	Design control systems	Low	6	control systems	Technical
40	Risk management	Low	6	Risk	Technical

Skill no	Skill	Demand from labour market	Occurrence	Keyword	Type
41	Assemble mechatronic units	Low	4	mechatronic	Technical
42	Design user interface	Low	4	user interface	Technical
43	Lead process optimisation	Low	4	optimisation	Technical
44	Embedded systems	Low	3	Embedded systems	Technical
45	Human-robot collaboration	Low	3	Human-machine interface	Technical
46	Integration of 5G services with Cloud Services	Low	3	5G	Technical
47	Machine-machine collaboration	Low	3	Human-machine interface	Technical
48	Principles of artificial intelligence	Low	3	artificial intelligence	Technical
49	Distributed computing	Low	2	Distributed computing	Technical
50	IFF systems and anti-surface warfare sensors	Low	2	warfare	Defence related
51	Perform data mining	Low	2	data mining	Technical
52	Signal processing	Low	2	Signal processing	Technical
53	Electronic Warfare	Low	2	Electronic Warfare	Defence related
54	Decision support systems	Low	1	Decision support systems	Technical
55	Geographic information systems (GIS)	Low	1	GIS	Defence related
56	Use localisation tools	Low	1	localisation	Technical

Table 21 - Occurrence identification.

Appendix 6. Labour market demand for the C4ISTAR technical skills

The labour market demand of a skill is classified based on the number of job postings in the Indeed website, posted in UK, US and Italy. The level of demand is assigned using the Pareto diagram, as described in the Section 2.2.4 of the R1.1 Strategy Specification. Table 20 shows for each of the C4ISTAR technical skills, sorted by the number of job posting retrieved:

- the C4ISTAR technologies related with the skill;
- the C4ISTAR applications related with the skill;
- the number of job posting retrieved on Indeed and related with the skill;
- the cumulative number of job posting;
- the cumulative share of the labour market demand for the skill;
- the level of labour market demand assigned to the skill.

Skill	Type	Technologies	Applications	Number of job postings	Cumulative number of job postings	Cumulative share	Level of labour market demand
interact through digital technologies	technical skill	software	communication	35932	35932	10.36 %	High
use online communication tools	technical skill	software	communication	35932	71864	20.71 %	High
maintain emergency vehicle equipment	technical skill	vehicles	communication	34359	106223	30.61 %	High
manage standard enterprise resource planning system	technical skill	software	planning	17069	123292	35.53 %	High
oversee development of software	technical skill	software	planning	17069	140361	40.45 %	High
use mine planning software	technical skill	software	planning	17069	157430	45.37 %	High
use production planning software	technical skill	software	planning	17069	174499	50.29 %	High
use specific data analysis software	technical skill	software	data analysis	15108	189607	54.65 %	High
coordinate remote communications	technical skill	radio	communication	9978	199585	57.52 %	Medium
perform scrambling operations	technical skill	radio	communication	9978	209563	60.4 %	Medium
apply frequency management	technical skill	radio	communication	9977	219540	63.27 %	Medium
maintain radio communications equipment	technical skill	radio	communication	9976	229516	66.15 %	Medium
relay messages through radio and telephone systems	technical skill	radio	communication	9976	239492	69.02 %	Medium
use automatic programming	technical skill	software	programming	9509	249001	71.76 %	Medium
use software design patterns	technical skill	software	programming	9509	258510	74.5 %	Medium
monitor system performance	technical skill	software	monitoring	9380	267890	77.21 %	Medium

Skill	Type	Technologies	Applications	Number of job postings	Cumulative number of job postings	Cumulative share	Level of labour market demand
administer ICT system	technical skill	software	monitoring	9358	277248	79.91 %	Medium
use reservoir surveillance	technical skill	surveillance systems	surveillance	8089	285337	82.24 %	Medium
coordinate technical standards for global interoperability	technical skill	surveillance systems	surveillance	8071	293408	84.56 %	Medium
solve problems	transversal skill			5982	299390	86.29 %	Medium
negotiation	transversal skill			5658	305048	87.92 %	Medium
help people	transversal skill			5100	310148	89.39 %	Medium
identify service requirements	technical skill	vehicles	identification	4140	314288	90.58 %	Low
provide leadership	transversal skill			3765	318053	91.67 %	Low
perform small vessel navigation	technical skill	radar	communication	3578	321631	92.7 %	Low
develop software prototype	technical skill	software	simulation	3470	325101	93.7 %	Low
interact with programmer on intention of consultancy work	technical skill	interfaces	programming	2511	327612	94.42 %	Low
implement ICT network diagnostic tools	technical skill	software	decision making	2118	329730	95.03 %	Low
use interface description language	technical skill	interfaces; software	programming	1962	331692	95.6 %	Low
team working	transversal skill			1864	333556	96.13 %	Low
Ensure safety	defence-related skill			1528	335084	96.57 %	Low
develop data processing applications	technical skill	software	data processing; programming	1257	336341	96.94 %	Low
develop data processing applications	technical skill	software	data processing; programming	1257	337598	97.3 %	Low
Ensure availability	defence-related skill			1117	338715	97.62 %	Low
conduct analysis of ship data	technical skill	software	data analysis; decision making	731	339446	97.83 %	Low
monitor satellites	technical skill	satellites	monitoring	716	340162	98.04 %	Low
persuade	transversal skill			578	340740	98.2 %	Low
solve location and navigation problems by using GPS tools	technical skill	satellites	navigation	564	341304	98.37 %	Low
use water navigation devices	technical skill	satellites	navigation	564	341868	98.53 %	Low
think critically	transversal skill			540	342408	98.68 %	Low
repair ICT devices	technical skill	mobile	communication	525	342933	98.84 %	Low
develop data link services for navigation purposes	technical skill	satellites	communication; navigation	500	343433	98.98 %	Low

Skill	Type	Technologies	Applications	Number of job postings	Cumulative number of job postings	Cumulative share	Level of labour market demand
develop data link services for navigation purposes	technical skill	satellites	communication; navigation	500	343933	99.12 %	Low
use ICT systems	technical skill	communications systems	communication	491	344424	99.27 %	Low
Ensure security	defence-related skill			459	344883	99.4 %	Low
innovate in ICT	technical skill	communications systems	communication	414	345297	99.52 %	Low
simplify communication in maritime management	technical skill	communications systems	communication	414	345711	99.64 %	Low
use a complex communication system	technical skill	communications systems	communication	414	346125	99.76 %	Low
teach computer science	technical skill	artificial intelligence; software	programming	387	346512	99.87 %	Low
remain focused	transversal skill			186	346698	99.92 %	Low
tactical planning	transversal skill			86	346784	99.95 %	Low
Ensure connectivity	defence-related skill			53	346837	99.96 %	Low
operate port communications systems	technical skill	communications systems; radio	communication	49	346886	99.98 %	Low
use aeronautical mobile service communications	technical skill	mobile; radio	communication	42	346928	99.99 %	Low
Ensure interoperability	defence-related skill			25	346953	99.99 %	Low
operational resilience	transversal skill			16	346969	100 %	Low
Ensure flexibility	defence-related skill			3	346972	100 %	Low
Know STANAG 4607	defence-related skill			0	346972	100 %	Low
Know STANAG 4609	defence-related skill			0	346972	100 %	Low
know software interaction design and use programming language such as C++, Java and Matlab	technical skill						

Table 22 - Results of the analysis on labour market demand for the C4ISTAR technical skills.

The Figure 3 reports the Pareto diagram of the labour market demand of the C4ISTAR technical skills.

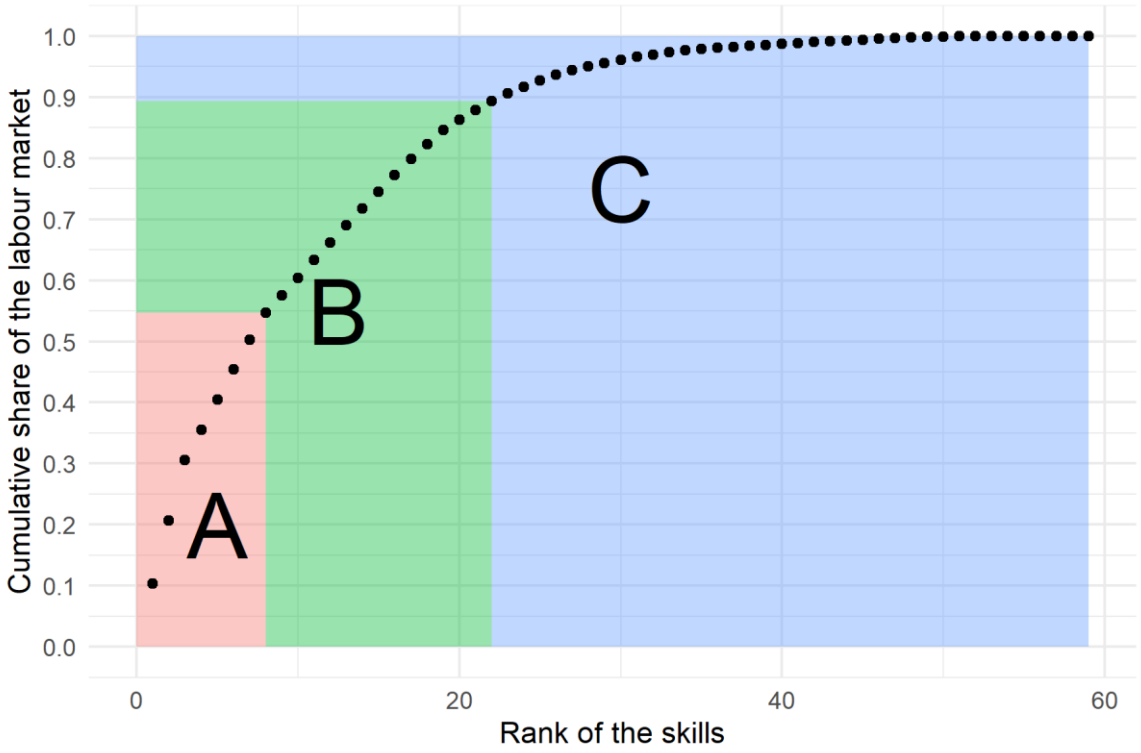

Figure 3 - Pareto diagram of the labour market demand of the C4ISTAR technical skills.

Appendix 7. Classification of skills in the Cybersecurity domain

This appendix contains the full table of results of the skills classification in the Cybersecurity domain. First, a table of all skills related to candidate technologies is listed. This is the subset of NICE skills that was afterward refined following the described methodology.

Selected technical skills from NICE before filtering

ID	**Description**
S0001	Skill in conducting vulnerability scans and recognizing vulnerabilities in security systems
S0003	Skill of identifying, capturing, containing, and reporting malware.
S0004	Skill in analyzing network traffic capacity and performance characteristics.
S0006	Skill in applying confidentiality, integrity, and availability principles.
S0007	Skill in applying host/network access controls (e.g., access control list)
S0009	Skill in assessing the robustness of security systems and designs.
S0010	Skill in conducting capabilities and requirements analysis
S0011	Skill in conducting information searches
S0012	Skill in conducting knowledge mapping (e.g., map of knowledge repositories).
S0014	Skill in conducting software debugging
S0015	Skill in conducting test events
S0018	Skill in creating policies that reflect system security objectives.
S0019	Skill in creating programs that validate and process multiple inputs including command line arguments, environmental variables, and input streams.
S0020	Skill in developing and deploying signatures.
S0025	Skill in detecting host and network based intrusions via intrusion detection technologies (e.g.,
S0026	Skill in determining an appropriate level of test rigor for a given system
S0027	Skill in determining how a security system should work (including its resilience and dependability capabilities) and how changes in conditions, operations, or the environment will affect these outcomes
S0031	Skill in developing and applying security system access controls
S0032	Skill in developing, testing, and implementing network infrastructure contingency and recovery plans.
S0033	Skill in diagnosing connectivity problems
S0036	Skill in evaluating the adequacy of security designs
S0040	Skill in implementing, maintaining, and improving established network security practices.
S0047	Skill in preserving evidence integrity according to standard operating procedures or national standards.
S0051	Skill in the use of penetration testing tools and techniques.
S0052	Skill in the use of social engineering techniques. (e.g., phishing, baiting, tailgating, etc.).
S0056	Skill in using network management tools to analyze network traffic patterns (e.g., simple network management protocol).

S0058	Skill in using the appropriate tools for repairing software, hardware, and peripheral equipment of a system
S0059	Skill in using Virtual Private Network (VPN) devices and encryption
S0062	Skill in analyzing memory dumps to extract information
S0063	Skill in collecting data from a variety of cyber defense resources
S0065	Skill in identifying and extracting data of forensic interest in diverse media (i.e., media forensics)
S0068	Skill in collecting, processing, packaging, transporting, and storing electronic evidence to avoid alteration, loss, physical damage, or destruction of data.
S0069	Skill in setting up a forensic workstation.
S0071	Skill in using forensic tool suites (e.g., EnCase,
S0075	Skill in conducting forensic analyses in multiple operating system environments (e.g., mobile device systems).
S0077	Skill in securing network communications.
S0078	Skill in recognizing and categorizing types of vulnerabilities and associated attacks
S0080	Skill in performing damage assessments
S0081	Skill in using network analysis tools to identify vulnerabilities. (e.g., fuzzing, nmap, etc.).
S0084	Skill in configuring and utilizing network protection components (e.g., Firewalls, VPNs, network intrusion detection systems).
S0087	Skill in deep analysis of captured malicious code (e.g., malware forensics).
S0088	Skill in using binary analysis tools (e.g., Hexedit, command code xxd, hexdump).
S0089	Skill in one
S0091	Skill in analyzing volatile data.
S0093	Skill in interpreting results of debugger to ascertain tactics, techniques, and procedures.
S0096	Skill in reading and interpreting signatures (e.g., snort).
S0100	Skill in utilizing or developing learning activities (e.g., scenarios, instructional games, interactive exercises).
S0101	Skill in utilizing technologies (e.g.,
S0120	Skill in reviewing logs to identify evidence of past intrusions.
S0124	Skill in troubleshooting and diagnosing cyber defense infrastructure anomalies and work through resolution
S0133	Skill in processing digital evidence, to include protecting and making legally sound copies of evidence
S0135	Skill in secure test plan design (e. g. unit, integration, system, acceptance).
S0137	Skill in conducting application vulnerability assessments
S0138	Skill in using Public
S0139	Skill in applying security models (e.g., Bell
S0156	Skill in performing packet
S0164	Skill in assessing the application of cryptographic standards.
S0167	Skill in recognizing vulnerabilities in security systems. (e.g., vulnerability and compliance scanning
S0171	Skill in performing impact/risk assessments.

S0173	Skill in using security event correlation tools
S0178	Skill in analyzing essential network data (e.g., router configuration files, routing protocols).
S0185	Skill in applying analytical methods typically employed to support planning and to justify recommended strategies and courses of action.
S0187	Skill in applying various analytical methods, tools, and techniques (e.g., competing hypotheses; chain of reasoning; scenario methods; denial and deception detection; high impact
S0195	Skill in conducting research using all available sources.
S0196	Skill in conducting research using deep web.
S0197	Skill in conducting social network analysis, buddy list analysis, and/or cookie analysis.
S0202	Skill in data mining techniques (e.g., searching file systems) and analysis
S0210	Skill in developing intelligence reports.
S0215	Skill in evaluating and interpreting metadata
S0221	Skill in extracting information from packet captures.
S0242	Skill in interpreting vulnerability scanner results to identify vulnerabilities.
S0247	Skill in performing data fusion from existing intelligence for enabling new and continued collection
S0256	Skill in providing understanding of target or threat systems through the identification and link analysis of physical, functional, or behavioral relationships.
S0258	Skill in recognizing and interpreting malicious network activity in traffic
S0259	Skill in recognizing denial and deception techniques of the target.
S0263	Skill in recognizing technical information that may be used for leads for metadata analysis
S0269	Skill in researching vulnerabilities and exploits utilized in traffic.
S0270	Skill in reverse engineering (e.g., hex editing, binary packaging utilities, debugging, and strings analysis) to identify function and ownership of remote tools.
S0280	Skill in target network anomaly identification (e.g., intrusions, dataflow or processing, target implementation of new technologies).
S0288	Skill in using multiple analytic tools, databases, and techniques (e.g., Analyst's Notebook, A
S0289	Skill in using multiple search engines (e.g., Google, Yahoo, LexisNexis, DataStar) and tools in conducting open
S0293	Skill in using tools, techniques, and procedures to remotely exploit and establish persistence on a target
S0295	Skill in using various open source data collection tools (online trade, DNS, mail, etc.)
S0298	Skill in verifying the integrity of all files. (e.g., checksums, Exclusive OR, secure hashes, check constraints, etc.)
S0317	Skill to compare indicators/observables with requirements.
S0318	Skill to conceptualize the entirety of the intelligence process in the multiple domains and dimensions
S0321	Skill to correlate intelligence priorities to the allocation of intelligence resources/assets.
S0322	Skill to craft indicators of operational progress/success.

S0333	Skill to graphically depict decision support materials containing intelligence and partner capability estimates.
S0343	Skill to orchestrate intelligence planning teams, coordinate collection and production support, and monitor status.
S0345	Skill to relate intelligence resources/assets to anticipated intelligence requirements
S0357	Skill to anticipate new security threats.
S0367	Skill to apply cybersecurity and privacy principles to organizational requirements (relevant to confidentiality, integrity, availability, authentication, non
S0371	Skill to respond and take local actions in response to threat sharing alerts from service providers

Selected transversal skills from NICE before filtering

ID	**Description**
S0037	Skill in generating queries and reports
S0055	Skill in using knowledge management technologies.
S0070	Skill in talking to others to convey information effectively
S0094	Skill in reading Hexadecimal data.
S0095	Skill in identifying common encoding techniques (e.g., Exclusive Disjunction [XOR], American Standard Code for Information Interchange [ASCII], Unicode, Base64, Uuencode, Uniform Resource Locator [URL] encode).
S0104	Skill in conducting Test Readiness Reviews.
S0140	Skill in applying the systems engineering process.
S0185	Skill in applying analytical methods typically employed to support planning and to justify recommended strategies and courses of action.
S0187	Skill in applying various analytical methods, tools, and techniques (e.g., competing hypotheses; chain of reasoning; scenario methods; denial and deception detection; high impact-low probability; network/association or link analysis; Bayesian, Delphi, and Pattern analyses).
S0191	Skill in assessing the applicability of available analytical tools to various situations.
S0228	Skill in identifying critical target elements, to include critical target elements for the cyber domain.
S0227	Skill in identifying alternative analytical interpretations to minimize unanticipated outcomes
S0243	Skill in knowledge management, including technical documentation techniques (e.g., Wiki page)
S0244	Skill in managing client relationships, including determining client needs/requirements, managing client expectations, and demonstrating commitment to delivering quality results.
S0249	Skill in preparing and presenting briefings.
S0250	Skill in preparing plans and related correspondence.
S0254	Skill in providing analysis to aid writing phased after action reports.
S0261	Skill in recognizing relevance of information
S0281	Skill in technical writing

S0289	Skill in using multiple search engines (e.g., Google, Yahoo, LexisNexis, DataStar) and tools in conducting open-source searches.
S0300	Skill in writing (and submitting) requirements to meet gaps in technical capabilities.
S0301	Skill in writing about facts and ideas in a clear, convincing, and organized manner.
S0302	Skill in writing effectiveness reports.
S0303	Skill in writing, reviewing and editing cyber-related Intelligence/assessment products from multiple sources.
S0306	Skill to analyze strategic guidance for issues requiring clarification and/or additional guidance.
S0311	Skill to apply the capabilities, limitations and tasking methodologies of available platforms, sensors, architectures and apparatus as they apply to organization objectives.
S0312	Skill to apply the process used to assess the performance and impact of cyber operations.
S0313	Skill to articulate a needs statement/requirement and integrate new and emerging collection capabilities, accesses and/or processes into collection operations.
S0314	Skill to articulate intelligence capabilities available to support execution of the plan.
S0315	Skill to articulate the needs of joint planners to all-source analysts.
S0322	Skill to craft indicators of operational progress/success
S0323	Skill to create and maintain up-to-date planning documents and tracking of services/production
S0331	Skill to express orally and in writing the relationship between intelligence capability limitations and decision-making risk and impacts on the overall operation.
S0336	Skill to identify when priority information requirements are satisfied.
S0338	Skill to interpret planning guidance to discern level of analytical support required.
S0339	Skill to interpret readiness reporting, its operational relevance and intelligence collection impact.
S0344	Skill to prepare and deliver reports, presentations and briefings, to include using visual aids or presentation technology.
S0348	Skill to specify collections and/or taskings that must be conducted in the near term
S0349	Skill to synchronize operational assessment procedures with the critical information requirement process.
S0350	Skill to synchronize planning activities and required intelligence support
S0356	Skill in communicating with all levels of management including Board members (e.g., interpersonal skills, approachability, effective listening skills, appropriate use of style and language for the audience).

After carrying out the described methodology, the team used a quantitative approach for measuring the indicators for the classification. Then the results have been translated in the qualitative evaluation (high/medium/low) adopted by all the WP1 teams and reported in the main part of the document, in the paragraph 2.3 “Classification of skills”.

With the support of the Erasmus+ Programme of the European Union

Occupation	Job profiles indicators				Skill	Skills indicators		DS degree of specialisation (1/H + I)	DK Degree of knowledge (E/F * I)	DLM demand from labour market (columns C x I)
	LinkedIn scale (1= between 1 and 500; 2=between 501 and 1000; 3>1000)	LinkedIn (worldwide)	Amount of Knowledges (from NICE)	Amount of Skills (from NICE)		Amount of Job profiles per skill (from NICE)	Affinity in the defense sector (expert judgment) [1=low;2=med;3=high]			
application engineer	1	151	11	7	skill to apply cybersecurity and privacy principles to organizational requirements (relevant to confidentiality, integrity, availability, authentication, non-repudiation)	14	2	**2,07**	**3,14**	**2**
					skill in applying confidentiality, integrity, and availability principles	3	2	**2,33**	**3,14**	**2**
					skill in conducting capabilities and requirements analysis	1	3	**4,00**	**4,71**	**3**

With the support of the Erasmus+ Programme of the European Union

Occupation	Job profiles indicators				Skill	Skills indicators		DS degree of specialisation (1/H + I)	DK Degree of knowledge (E/F * I)	DLM demand from labour market (columns C x I)
	LinkedIn scale (1= between 1 and 500; 2=between 501 and 1000; 3>1000)	LinkedIn (worldwide)	Amount of Knowledges (from NICE)	Amount of Skills (from NICE)		Amount of Job profiles per skill (from NICE)	Affinity in the defense sector (expert judgment) [1=low;2=med;3=high]			
chief ict security officer	1	Chief Security Officer - 13	39	2	skill to apply cybersecurity and privacy principles to organizational requirements (relevant to confidentiality, integrity, availability, authentication, non-repudiation)	14	3	**3,07**	**58,50**	**3**
collection manager	1	28	82	23	skill to compare indicators/observables with requirements	2	2	**2,50**	**7,13**	**2**

With the support of the Erasmus+ Programme of the European Union

Occupation	Job profiles indicators				Skill	Skills indicators		DS degree of specialisation (1/H + I)	DK Degree of knowledge (E/F * I)	DLM demand from labour market (columns C x I)
	LinkedIn scale (1= between 1 and 500; 2=between 501 and 1000; 3>1000)	LinkedIn (worldwide)	Amount of Knowledges (from NICE)	Amount of Skills (from NICE)		Amount of Job profiles per skill (from NICE)	Affinity in the defense sector (expert judgment) [1=low;2=med;3=high]			
criminal investigator	1	4	42	19	skill in developing, testing, and implementing network infrastructure contingency and recovery plans	2	1	**1,50**	**2,21**	**1**
					skill in deep analysis of captured malicious code (e.g., malware forensics)	2	3	**3,50**	**6,63**	**3**
					skill in one-way hash functions (e.g., secure hash algorithm [sha], message digest algorithm [md5]) and verifying the integrity of all files	3	2	**2,33**	**4,42**	**2**
					skill in interpreting results of debugger to ascertain tactics, techniques, and procedures	2	3	**3,50**	**6,63**	**3**

With the support of the Erasmus+ Programme of the European Union

Occupation	Job profiles indicators				Skill	Skills indicators		DS degree of specialisation (1/H + I)	DK Degree of knowledge (E/F * I)	DLM demand from labour market (columns C x I)
	LinkedIn scale (1= between 1 and 500; 2=between 501 and 1000; 3>1000)	LinkedIn (worldwide)	Amount of Knowledges (from NICE)	Amount of Skills (from NICE)		Amount of Job profiles per skill (from NICE)	Affinity in the defense sector (expert judgment) [1=low;2=med;3=high]			
cyber defense analyst	2	cyber analyst 735	70	15	skill to apply cybersecurity and privacy principles to organizational requirements (relevant to confidentiality,integrity, availability, authentication, non-repudiation)	14	2	**2,07**	**9,33**	**4**
					skill in determining how a security system should work (including its resilience and dependability capabilities) and how changes in conditions, operations, or the environment will affect these outcomes	7	3	**3,14**	**14,00**	**6**
					skill in recognizing and categorizing types of	3	2	**2,33**	**9,33**	**4**

Occupation	Job profiles indicators				Skill	Skills indicators		DS degree of specialisation (1/H + I)	DK Degree of knowledge (E/F * I)	DLM demand from labour market (columns C x I)
	LinkedIn scale (1= between 1 and 500; 2=between 501 and 1000; 3>1000)	LinkedIn (worldwide)	Amount of Knowledges (from NICE)	Amount of Skills (from NICE)		Amount of Job profiles per skill (from NICE)	Affinity in the defense sector (expert judgment) [1=low;2=med;3=high]			
					vulnerabilities and associated attacks					
					skill in reading and interpreting signatures (e.g., snort)	1	2	**3,00**	**9,33**	**4**
					skill in performing packet-level analysis	3	2	**2,33**	**9,33**	**4**
					skill in developing and deploying signatures	1	2	**3,00**	**9,33**	**4**
					skill in evaluating the adequacy of security designs	4	2	**2,25**	**9,33**	**4**
					skill in collecting data from a variety of cyber defense resources	1	3	**4,00**	**14,00**	**6**
cyber defense incident responder	1	56	30	8	skill in securing network communications	3	3	**3,33**	**11,25**	**3**
					skill in recognizing and categorizing types of	3	2	**2,33**	**7,50**	**2**

Occupation	Job profiles indicators				Skill	Skills indicators		DS degree of specialisation (1/H + I)	DK Degree of knowledge (E/F * I)	DLM demand from labour market (columns C x I)
	LinkedIn scale (1= between 1 and 500; 2=between 501 and 1000; 3>1000)	LinkedIn (worldwide)	Amount of Knowledges (from NICE)	Amount of Skills (from NICE)		Amount of Job profiles per skill (from NICE)	Affinity in the defense sector (expert judgment) [1=low;2=med;3=high]			
					vulnerabilities and associated attacks					
					skill in using security event correlation tools	2	3	**3,50**	**11,25**	**3**
cyber defense infrastructure support specialist	2	cyber defense infrastructure 743	7	9	skill to apply cybersecurity and privacy principles to organizational requirements (relevant to confidentiality, integrity, availability, authentication, non-repudiation)	14	2	**2,07**	**1,56**	**4**
					skill in troubleshooting and diagnosing cyber defense infrastructure anomalies and work through resolution	2	3	**3,50**	**2,33**	**6**
					skill in securing network communications	3	2	**2,33**	**1,56**	**4**

With the support of the Erasmus+ Programme of the European Union

Occupation	Job profiles indicators				Skill	Skills indicators		DS degree of specialisation (1/H + I)	DK Degree of knowledge (E/F * I)	DLM demand from labour market (columns C x I)
	LinkedIn scale (1= between 1 and 500; 2=between 501 and 1000; 3>1000)	LinkedIn (worldwide)	Amount of Knowledges (from NICE)	Amount of Skills (from NICE)		Amount of Job profiles per skill (from NICE)	Affinity in the defense sector (expert judgment) [1=low;2=med;3=high]			
					skill in applying host/network access controls (e.g., access control list)	1	2	**3,00**	**1,56**	**4**
cyber intel planner	1	10	89	36	skill in applying analytical methods typically employed to support planning and to justify recommended strategies and courses of action	2	3	**3,50**	**7,42**	**3**
cyber operator	1	67	44	26	skill in extracting information from packet captures	1	1	**2,00**	**1,69**	**1**

Occupation	Job profiles indicators				Skill	Skills indicators		DS degree of specialisation (1/H + I)	DK Degree of knowledge (E/F * I)	DLM demand from labour market (columns C x I)
	LinkedIn scale (1= between 1 and 500; 2=between 501 and 1000; 3>1000)	LinkedIn (worldwide)	Amount of Knowledges (from NICE)	Amount of Skills (from NICE)		Amount of Job profiles per skill (from NICE)	Affinity in the defense sector (expert judgment) [1=low;2=med;3=high]			
					skill in data mining techniques (e.g., searching file systems) and analysis	2	2	**2,50**	**3,38**	**2**
					skill in reverse engineering (e.g., hex editing, binary packaging utilities, debugging, and strings analysis) to identify function and ownership of remote tools	2	1	**1,50**	**1,69**	**1**
cyber ops planner	1	8	63	18	skill in applying analytical methods typically employed to support planning and to justify recommended strategies and courses of action	2	3	**3,50**	**10,50**	**3**

With the support of the Erasmus+ Programme of the European Union

Occupation	Job profiles indicators				Skill	Skills indicators		DS degree of specialisation (1/H + I)	DK Degree of knowledge (E/F * I)	DLM demand from labour market (columns C x I)
	LinkedIn scale (1= between 1 and 500; 2=between 501 and 1000; 3>1000)	LinkedIn (worldwide)	Amount of Knowledges (from NICE)	Amount of Skills (from NICE)		Amount of Job profiles per skill (from NICE)	Affinity in the defense sector (expert judgment) [1=low;2=med;3=high]			
data analyst	3	+15.000	32	26	skill in data mining techniques (e.g., searching file systems) and analysis	2	3	**3,50**	**3,69**	**9**
					skill in using multiple analytic tools, databases, and techniques (e.g., analyst's notebook, a-space, anchory, m3, divergent/convergent thinking, link charts, matrices, etc.)	4	3	**3,25**	**3,69**	**9**
					skill in one-way hash functions (e.g., secure hash algorithm [sha], message digest algorithm [md5]) and verifying the integrity of all files	3	1	**1,33**	**1,23**	**3**
	1	11	46	22	skill in performing packet-level analysis	3	3	**3,33**	**6,27**	**3**

With the support of the Erasmus+ Programme of the European Union

Occupation	Job profiles indicators				Skill	Skills indicators		DS degree of specialisation (1/H + I)	DK Degree of knowledge (E/F * I)	DLM demand from labour market (columns C x I)
	LinkedIn scale (1= between 1 and 500; 2=between 501 and 1000; 3>1000)	LinkedIn (worldwide)	Amount of Knowledges (from NICE)	Amount of Skills (from NICE)		Amount of Job profiles per skill (from NICE)	Affinity in the defense sector (expert judgment) [1=low;2=med;3=high]			
digital forensics expert					skill in developing, testing, and implementing network infrastructure contingency and recovery plans	2	1	**1,50**	**2,09**	**1**
					skill in deep analysis of captured malicious code (e.g., malware forensics)	2	3	**3,50**	**6,27**	**3**
					skill in one-way hash functions (e.g., secure hash algorithm [sha], message digest algorithm [md5]) and verifying the integrity of all files	3	2	**2,33**	**4,18**	**2**
					skill in interpreting results of debugger to ascertain tactics, techniques, and procedures	2	3	**3,50**	**6,27**	**3**

With the support of the Erasmus+ Programme of the European Union

Occupation	Job profiles indicators				Skill	Skills indicators		DS degree of specialisation (1/H + I)	DK Degree of knowledge (E/F * I)	DLM demand from labour market (columns C x I)
	LinkedIn scale (1= between 1 and 500; 2=between 501 and 1000; 3>1000)	LinkedIn (worldwide)	Amount of Knowledges (from NICE)	Amount of Skills (from NICE)		Amount of Job profiles per skill (from NICE)	Affinity in the defense sector (expert judgment) [1=low;2=med;3=high]			
enterprise architect	3	+5.000	52	8	skill to apply cybersecurity and privacy principles to organizational requirements (relevant to confidentiality, integrity, availability, authentication, non-repudiation)	14	3	**3,07**	**19,50**	**9**
					skill in determining how a security system should work (including its resilience and dependability capabilities) and how changes in conditions, operations, or the environment will affect these outcomes	7	2	**2,14**	**13,00**	**6**
exploitation analyst	1	169	48	24	skill in recognizing and interpreting malicious network activity in traffic	1	3	**4,00**	**6,00**	**3**

With the support of the Erasmus+ Programme of the European Union

Occupation	Job profiles indicators				Skill	Skills indicators		DS degree of specialisation (1/H + I)	DK Degree of knowledge (E/F * I)	DLM demand from labour market (columns C x I)
	LinkedIn scale (1= between 1 and 500; 2=between 501 and 1000; 3>1000)	LinkedIn (worldwide)	Amount of Knowledges (from NICE)	Amount of Skills (from NICE)		Amount of Job profiles per skill (from NICE)	Affinity in the defense sector (expert judgment) [1=low;2=med;3=high]			
					skill in researching vulnerabilities and exploits utilized in traffic	1	3	**4,00**	**6,00**	**3**
ict network administrator	1	8	30	8	skill in securing network communications	3	3	**3,33**	**11,25**	**3**
					skill in implementing, maintaining, and improving established network security practices	1	3	**4,00**	**11,25**	**3**

With the support of the Erasmus+ Programme of the European Union

Occupation	Job profiles indicators				Skill	Skills indicators		DS degree of specialisation (1/H + I)	DK Degree of knowledge (E/F * I)	DLM demand from labour market (columns C x I)
	LinkedIn scale (1= between 1 and 500; 2=between 501 and 1000; 3>1000)	LinkedIn (worldwide)	Amount of Knowledges (from NICE)	Amount of Skills (from NICE)		Amount of Job profiles per skill (from NICE)	Affinity in the defense sector (expert judgment) [1=low;2=med;3=high]			
					skill in configuring and utilizing network protection components (e.g., firewalls, vpns, network intrusion detection systems)"	2	2	**2,50**	**7,50**	**2**
ict product manager	1	1	47	22	skill in using multiple analytic tools, databases, and techniques (e.g., analyst's notebook, a-space, anchory, m3, divergent/convergent thinking, link charts, matrices, etc.)	4	1	**1,25**	**2,14**	**1**

With the support of the Erasmus+ Programme of the European Union

Occupation	Job profiles indicators				Skill	Skills indicators		DS degree of specialisation (1/H + I)	DK Degree of knowledge (E/F * I)	DLM demand from labour market (columns C x I)
	LinkedIn scale (1= between 1 and 500; 2=between 501 and 1000; 3>1000)	LinkedIn (worldwide)	Amount of Knowledges (from NICE)	Amount of Skills (from NICE)		Amount of Job profiles per skill (from NICE)	Affinity in the defense sector (expert judgment) [1=low;2=med;3=high]			
ict quality assurance manager	3	quality assurance manager +2.000	53	68	skill to apply cybersecurity and privacy principles to organizational requirements (relevant to confidentiality, integrity, availability, authentication, non-repudiation)	14	2	**2,07**	**1,56**	**6**
					skill in troubleshooting and diagnosing cyber defense infrastructure anomalies and work through resolution	2	2	**2,50**	**1,56**	**6**
					skill in applying confidentiality, integrity, and availability principles	3	2	**2,33**	**1,56**	**6**

With the support of the Erasmus+ Programme of the European Union

Occupation	Job profiles indicators				Skill	Skills indicators		DS degree of specialisation (1/H + I)	DK Degree of knowledge (E/F * I)	DLM demand from labour market (columns C x I)
	LinkedIn scale (1= between 1 and 500; 2=between 501 and 1000; 3>1000)	LinkedIn (worldwide)	Amount of Knowledges (from NICE)	Amount of Skills (from NICE)		Amount of Job profiles per skill (from NICE)	Affinity in the defense sector (expert judgment) [1=low;2=med;3=high]			
					skill in determining how a security system should work (including its resilience and dependability capabilities) and how changes in conditions, operations, or the environment will affect these outcomes	7	3	**3,14**	**2,34**	**9**
					skill in recognizing and categorizing types of vulnerabilities and associated attacks	3	1	**1,33**	**0,78**	**3**
					skill in using security event correlation tools	2	1	**1,50**	**0,78**	**3**
					skill in reviewing logs to identify evidence of past intrusions	2	1	**1,50**	**0,78**	**3**

With the support of the Erasmus+ Programme of the European Union

Occupation	Job profiles indicators				Skill	Skills indicators		DS degree of specialisation (1/H + I)	DK Degree of knowledge (E/F * I)	DLM demand from labour market (columns C x I)
	LinkedIn scale (1= between 1 and 500; 2=between 501 and 1000; 3>1000)	LinkedIn (worldwide)	Amount of Knowledges (from NICE)	Amount of Skills (from NICE)		Amount of Job profiles per skill (from NICE)	Affinity in the defense sector (expert judgment) [1=low;2=med;3=high]			
					skill in using public-key infrastructure (pki) encryption and digital signature capabilities into applications (e.g., s/mime email, ssl traffic)	5	1	**1,20**	**0,78**	**3**
ict resilience manager	1	resilience manager 30	14	5	skill to anticipate new security threats	1	2	**3,00**	**5,60**	**2**
					skill in creating policies that reflect system security objectives	3	3	**3,33**	**8,40**	**3**
ict security manager	1	4	47	17	skill in determining how a security system should work (including its resilience and dependability capabilities) and how changes in conditions, operations, or the	7	3	**3,14**	**8,29**	**3**

Occupation	Job profiles indicators				Skill	Skills indicators		DS degree of specialisation (1/H + I)	DK Degree of knowledge (E/F * I)	DLM demand from labour market (columns C x I)
	LinkedIn scale (1= between 1 and 500; 2=between 501 and 1000; 3>1000)	LinkedIn (worldwide)	Amount of Knowledges (from NICE)	Amount of Skills (from NICE)		Amount of Job profiles per skill (from NICE)	Affinity in the defense sector (expert judgment) [1=low;2=med;3=high]			
					environment will affect these outcomes					
					skill in using multiple analytic tools, databases, and techniques (e.g., analyst's notebook, a-space, anchory, m3, divergent/convergent thinking, link charts, matrices, etc.)	4	2	**2,25**	**5,53**	**2**
					skill in using public-key infrastructure (pki) encryption and digital signature capabilities into applications (e.g., s/mime email, ssl traffic)	5	2	**2,20**	**5,53**	**2**

Occupation	Job profiles indicators				Skill	Skills indicators		DS degree of specialisation (1/H + I)	DK Degree of knowledge (E/F * I)	DLM demand from labour market (columns C x I)
	LinkedIn scale (1= between 1 and 500; 2=between 501 and 1000; 3>1000)	LinkedIn (worldwide)	Amount of Knowledges (from NICE)	Amount of Skills (from NICE)		Amount of Job profiles per skill (from NICE)	Affinity in the defense sector (expert judgment) [1=low;2=med;3=high]			
					skill to respond and take local actions in response to threat sharing alerts from service providers"	1	2	**3,00**	**5,53**	**2**
ict system developer	1	1	35	12	skill to apply cybersecurity and privacy principles to organizational requirements (relevant to confidentiality, integrity, availability, authentication, non-repudiation)	14	3	**3,07**	**8,75**	**3**
					skill in reviewing logs to identify evidence of past intrusions	2	1	**1,50**	**2,92**	**1**

With the support of the Erasmus+ Programme of the European Union

Occupation	Job profiles indicators				Skill	Skills indicators		DS degree of specialisation (1/H + I)	DK Degree of knowledge (E/F * I)	DLM demand from labour market (columns C x I)
	LinkedIn scale (1= between 1 and 500; 2=between 501 and 1000; 3>1000)	LinkedIn (worldwide)	Amount of Knowledges (from NICE)	Amount of Skills (from NICE)		Amount of Job profiles per skill (from NICE)	Affinity in the defense sector (expert judgment) [1=low;2=med;3=high]			
ict trainer	1	27	10	6	skill in applying confidentiality, integrity, and availability principles	3	2	**2,33**	**3,33**	**2**
					skill in performing packet-level analysis	3	2	**2,33**	**3,33**	**2**
					skill in configuring and utilizing network protection components	2	2	**2,50**	**3,33**	**2**

With the support of the Erasmus+ Programme of the European Union

Occupation	Job profiles indicators				Skill	Skills indicators		DS degree of specialisation (1/H + I)	DK Degree of knowledge (E/F * I)	DLM demand from labour market (columns C x I)
	LinkedIn scale (1= between 1 and 500; 2=between 501 and 1000; 3>1000)	LinkedIn (worldwide)	Amount of Knowledges (from NICE)	Amount of Skills (from NICE)		Amount of Job profiles per skill (from NICE)	Affinity in the defense sector (expert judgment) [1=low;2=med;3=high]			
					(e.g., firewalls, vpns, network intrusion detection systems)					
					skill in reverse engineering (e.g., hex editing, binary packaging utilities, debugging, and strings analysis) to identify function and ownership of remote tools	2	2	**2,50**	**3,33**	**2**
					skill in developing and executing technical training programs and curricula	2	3	**3,50**	**5,00**	**3**
information systems security developer	1	29	58	11	skill to apply cybersecurity and privacy principles to organizational requirements (relevant to confidentiality, integrity, availability, authentication, non-repudiation)	14	3	**3,07**	**15,82**	**3**

With the support of the Erasmus+ Programme of the European Union

Occupation	Job profiles indicators				Skill	Skills indicators		DS degree of specialisation (1/H + I)	DK Degree of knowledge (E/F * I)	DLM demand from labour market (columns C x I)
	LinkedIn scale (1= between 1 and 500; 2=between 501 and 1000; 3>1000)	LinkedIn (worldwide)	Amount of Knowledges (from NICE)	Amount of Skills (from NICE)		Amount of Job profiles per skill (from NICE)	Affinity in the defense sector (expert judgment) [1=low;2=med;3=high]			
					skill in developing and applying security system access controls	5	3	**3,20**	**15,82**	**3**
					skill in evaluating the adequacy of security designs	4	3	**3,25**	**15,82**	**3**

With the support of the Erasmus+ Programme of the European Union

Occupation	Job profiles indicators				Skill	Skills indicators		DS degree of specialisation (1/H + I)	DK Degree of knowledge (E/F * I)	DLM demand from labour market (columns C x I)
	LinkedIn scale (1= between 1 and 500; 2=between 501 and 1000; 3>1000)	LinkedIn (worldwide)	Amount of Knowledges (from NICE)	Amount of Skills (from NICE)		Amount of Job profiles per skill (from NICE)	Affinity in the defense sector (expert judgment) [1=low;2=med;3=high]			
knowledge engineer	2	862	47	28	skill in conducting research using all available sources (including deep web)	1	2	**3,00**	**3,36**	**4**

With the support of the Erasmus+ Programme of the European Union

Occupation	Job profiles indicators				Skill	Skills indicators		DS degree of specialisation (1/H + I)	DK Degree of knowledge (E/F * I)	DLM demand from labour market (columns C x I)
	LinkedIn scale (1= between 1 and 500; 2=between 501 and 1000; 3>1000)	LinkedIn (worldwide)	Amount of Knowledges (from NICE)	Amount of Skills (from NICE)		Amount of Job profiles per skill (from NICE)	Affinity in the defense sector (expert judgment) [1=low;2=med;3=high]			
partner integration planner	1	2	41	10	skill in applying analytical methods typically employed to support planning and to justify recommended strategies and courses of action	2	3	**3,50**	**12,30**	**3**
production engineering technician	1	15	28	15	skill to apply cybersecurity and privacy principles to organizational requirements (relevant to confidentiality, integrity, availability, authentication, non-repudiation)	14	2	**2,07**	**3,73**	**2**
					skill in conducting test event and secure test plan design (e. g. unit, integration, system, acceptance)	1	3	**4,00**	**5,60**	**3**

With the support of the Erasmus+ Programme of the European Union

Occupation	Job profiles indicators				Skill	Skills indicators		DS degree of specialisation (1/H + I)	DK Degree of knowledge (E/F * I)	DLM demand from labour market (columns C x I)
	LinkedIn scale (1= between 1 and 500; 2=between 501 and 1000; 3>1000)	LinkedIn (worldwide)	Amount of Knowledges (from NICE)	Amount of Skills (from NICE)		Amount of Job profiles per skill (from NICE)	Affinity in the defense sector (expert judgment) [1=low;2=med;3=high]			
secure software assessor	1	20	44	10	skill to apply cybersecurity and privacy principles to organizational requirements (relevant to confidentiality, integrity, availability, authentication, non-repudiation)	14	2	**2,07**	**8,80**	**2**
					skill in developing and applying security system access controls	5	2	**2,20**	**8,80**	**2**
					skill in using public-key infrastructure (pki) encryption and digital signature capabilities into applications (e.g., s/mime email, ssl traffic)	5	1	**1,20**	**4,40**	**1**

With the support of the Erasmus+ Programme of the European Union

Occupation	Job profiles indicators				Skill	Skills indicators		DS degree of specialisation (1/H + I)	DK Degree of knowledge (E/F * I)	DLM demand from labour market (columns C x I)
	LinkedIn scale (1= between 1 and 500; 2=between 501 and 1000; 3>1000)	LinkedIn (worldwide)	Amount of Knowledges (from NICE)	Amount of Skills (from NICE)		Amount of Job profiles per skill (from NICE)	Affinity in the defense sector (expert judgment) [1=low;2=med;3=high]			
security architect	3	+2.000	70	17	skill to apply cybersecurity and privacy principles to organizational requirements (relevant to confidentiality, integrity, availability, authentication, non-repudiation)	14	3	**3,07**	**12,35**	**9**
					skill in determining how a security system should work (including its resilience and dependability capabilities) and how changes in conditions, operations, or the environment will affect these outcomes	7	3	**3,14**	**12,35**	**9**
					skill in using public-key infrastructure (pki) encryption and digital signature capabilities	5	1	**1,20**	**4,12**	**3**

Occupation	Job profiles indicators				Skill	Skills indicators		DS degree of specialisation (1/H + I)	DK Degree of knowledge (E/F * I)	DLM demand from labour market (columns C x I)
	LinkedIn scale (1= between 1 and 500; 2=between 501 and 1000; 3>1000)	LinkedIn (worldwide)	Amount of Knowledges (from NICE)	Amount of Skills (from NICE)		Amount of Job profiles per skill (from NICE)	Affinity in the defense sector (expert judgment) [1=low;2=med;3=high]			
					into applications (e.g.,s/mime email, ssl traffic)					
					skill in assessing the application of cryptographic standards	1	2	**3,00**	**8,24**	**6**
security manager	3	+8.000	70	17	skill in determining how a security system should work (including its resilience and dependability capabilities) and how changes in conditions, operations, or the environment will affect these outcomes	7	2	**2,14**	**8,24**	**6**
					skill in creating policies that reflect system security objectives	3	2	**2,33**	**8,24**	**6**
software developer	3	+40.000	37	14	skill to apply cybersecurity and privacy principles to organizational requirements	14	1	**1,07**	**2,64**	**3**

Occupation	Job profiles indicators				Skill	Skills indicators		DS degree of specialisation (1/H + I)	DK Degree of knowledge (E/F * I)	DLM demand from labour market (columns C x I)
	LinkedIn scale (1= between 1 and 500; 2=between 501 and 1000; 3>1000)	LinkedIn (worldwide)	Amount of Knowledges (from NICE)	Amount of Skills (from NICE)		Amount of Job profiles per skill (from NICE)	Affinity in the defense sector (expert judgment) [1=low;2=med;3=high]			
					(relevant to confidentiality, integrity, availability, authentication, non-repudiation)					
					skill in creating policies that reflect system security objectives	3	1	**1,33**	**2,64**	**3**
					skill in developing and applying security system access controls	5	3	**3,20**	**7,93**	**9**
					skill in evaluating the adequacy of security designs	4	2	**2,25**	**5,29**	**6**
					skill in using public-key infrastructure (pki) encryption and digital signature capabilities into applications (e.g., s/mime email, ssl traffic)	5	3	**3,20**	**7,93**	**9**
systems security analyst	1	137	5	9	skill to apply cybersecurity and privacy principles to organizational requirements	14	2	**2,07**	**1,11**	**2**

Occupation	Job profiles indicators				Skill	Skills indicators		DS degree of specialisation (1/H + I)	DK Degree of knowledge (E/F * I)	DLM demand from labour market (columns C x I)
	LinkedIn scale (1= between 1 and 500; 2=between 501 and 1000; 3>1000)	LinkedIn (worldwide)	Amount of Knowledges (from NICE)	Amount of Skills (from NICE)		Amount of Job profiles per skill (from NICE)	Affinity in the defense sector (expert judgment) [1=low;2=med;3=high]			
					(relevant to confidentiality, integrity, availability, authentication, non-repudiation)					
					skill in determining how a security system should work (including its resilience and dependability capabilities) and how changes in conditions, operations, or the environment will affect these outcomes	7	3	**3,14**	**1,67**	**3**
					skill in developing and applying security system access controls	5	2	**2,20**	**1,11**	**2**
					skill in evaluating the adequacy of security designs	4	2	**2,25**	**1,11**	**2**

With the support of the Erasmus+ Programme of the European Union

Occupation	Job profiles indicators				Skill	Skills indicators		DS degree of specialisation (1/H + I)	DK Degree of knowledge (E/F * I)	DLM demand from labour market (columns C x I)
	LinkedIn scale (1= between 1 and 500; 2=between 501 and 1000; 3>1000)	LinkedIn (worldwide)	Amount of Knowledges (from NICE)	Amount of Skills (from NICE)		Amount of Job profiles per skill (from NICE)	Affinity in the defense sector (expert judgment) [1=low;2=med;3=high]			
target developer	3	+5.000	64	28	skill in using multiple analytic tools, databases, and techniques (e.g., analyst's notebook, a-space, anchory, m3, divergent/convergent thinking, link charts, matrices, etc.)	4	1	**1,25**	**2,29**	**3**
target network analyst	1	180	45	36	skill in analyzing essential network data (e.g., router configuration files, routing protocols), network traffic capacity and performance characteristics	1	2	**3,00**	**2,50**	**2**
					skill in conducting social network analysis, buddy list analysis, and/or cookie analysis	1	2	**3,00**	**2,50**	**2**

With the support of the
Erasmus+ Programme
of the European Union