Cybersecurity Skills in Portugal

How is Portugal addressing the issue of cybersecurity skills gap?

Situational Context → National and European Frameworks → C-Academy

STUDY ON HIGHER EDUCATION IN CYBERSECURITY IN PORTUGAL

Presents a characterization of cybersecurity contents and study cycles in the area of Computer Science in Portugal, focusing on higher education. It also analyses the master's dissertations and doctoral theses, over the last 10 years, in cybersecurity.

Remarks

- Almost half of the computer science courses have curricular units related to cybersecurity, but only 21% of the graduates belong to these courses – not enough.

- There is only one undergraduate degree and one PhD specifically in this area and the number of graduates in courses in this area represents 2% of the total - not enough.

- The number of women graduating in this area or in courses with curricular units in this area is below the average for ICT courses.

- The evolution of the number of master's and doctoral dissertations and theses in this area has been unstable and very focused on technical and military areas.

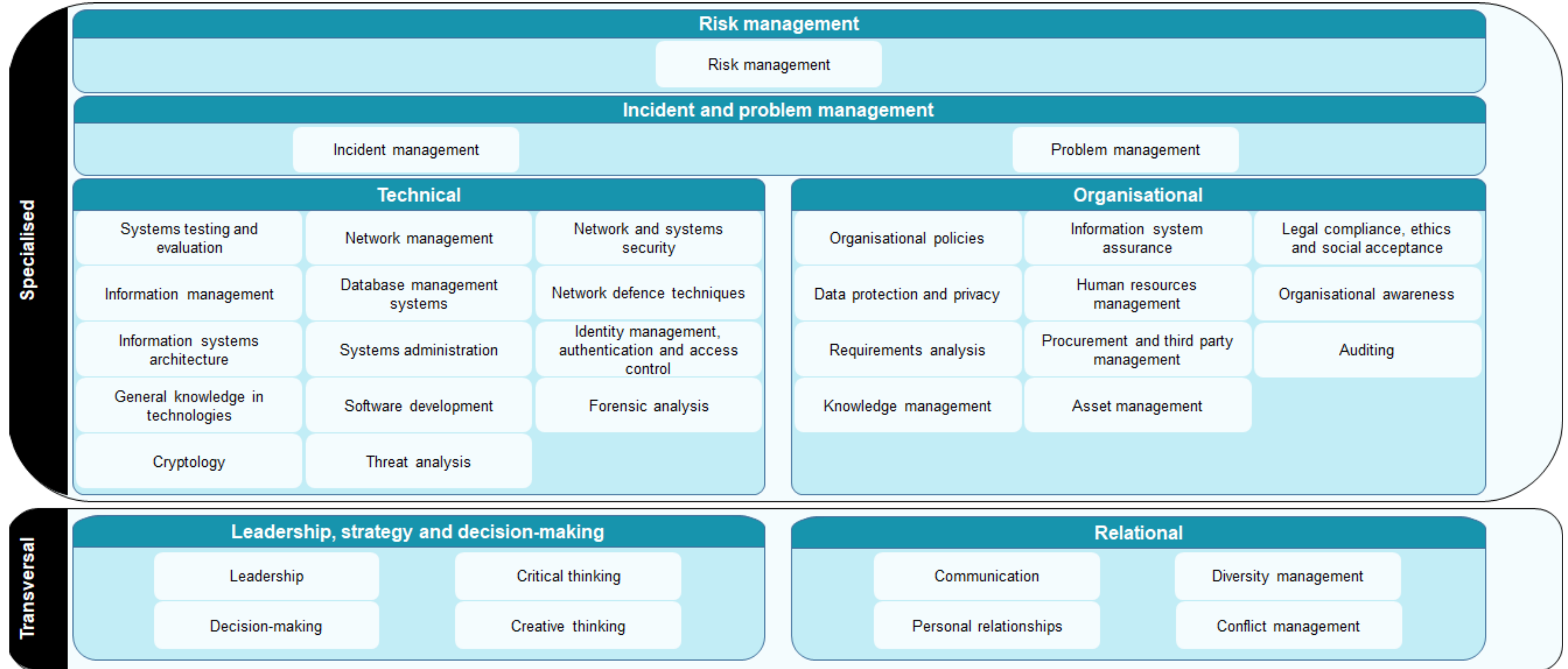- The market needs more professionals.

Cybersecurity Competencies Framework

Aligned with the Portuguese National Strategy for Cyberspace

Security 2019-2023, the Framework aims at identifying

competencies and knowledge for cybersecurity, thus facilitating the

inclusion of these subject matters in the curricular structure of

primary, secondary, higher education, and in the continuing training

of teachers, as well as the promotion of advanced technical training

in cybersecurity in university and polytechnic institutions, in order to

meet the national needs of professionals in the field.

Cybersecurity Competencies Framework

Architecture of the Cybersecurity Competencies Framework, structured in domains and subdomains.

Specialised				
Risk management				
Risk management				
Incident and problem management				
Incident management			Problem management	

Technical

Systems testing and evaluation	Network management	Network and systems security
Information management	Database management systems	Network defence techniques
Information systems architecture	Systems administration	Identity management, authentication and access control
General knowledge in technologies	Software development	Forensic analysis
Cryptology	Threat analysis	

Organisational

Organisational policies	Information system assurance	Legal compliance, ethics and social acceptance
Data protection and privacy	Human resources management	Organisational awareness
Requirements analysis	Procurement and third party management	Auditing
Knowledge management	Asset management	

Transversal

Leadership, strategy and decision-making

Leadership	Critical thinking
Decision-making	Creative thinking

Relational

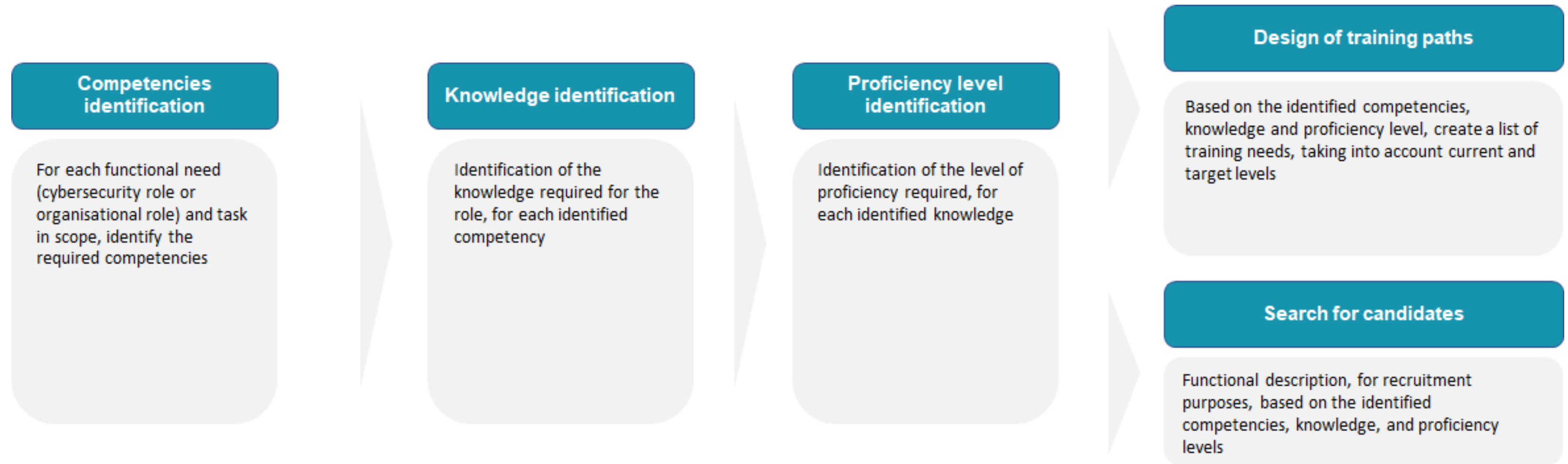|	
Communication	Diversity management
Personal relationships	Conflict management

CNCS

Cybersecurity Competencies Framework

Conceptual map of competencies for cybersecurity, relating the concepts of competencies, role, task, knowledge, as well as listing the proficiency levels
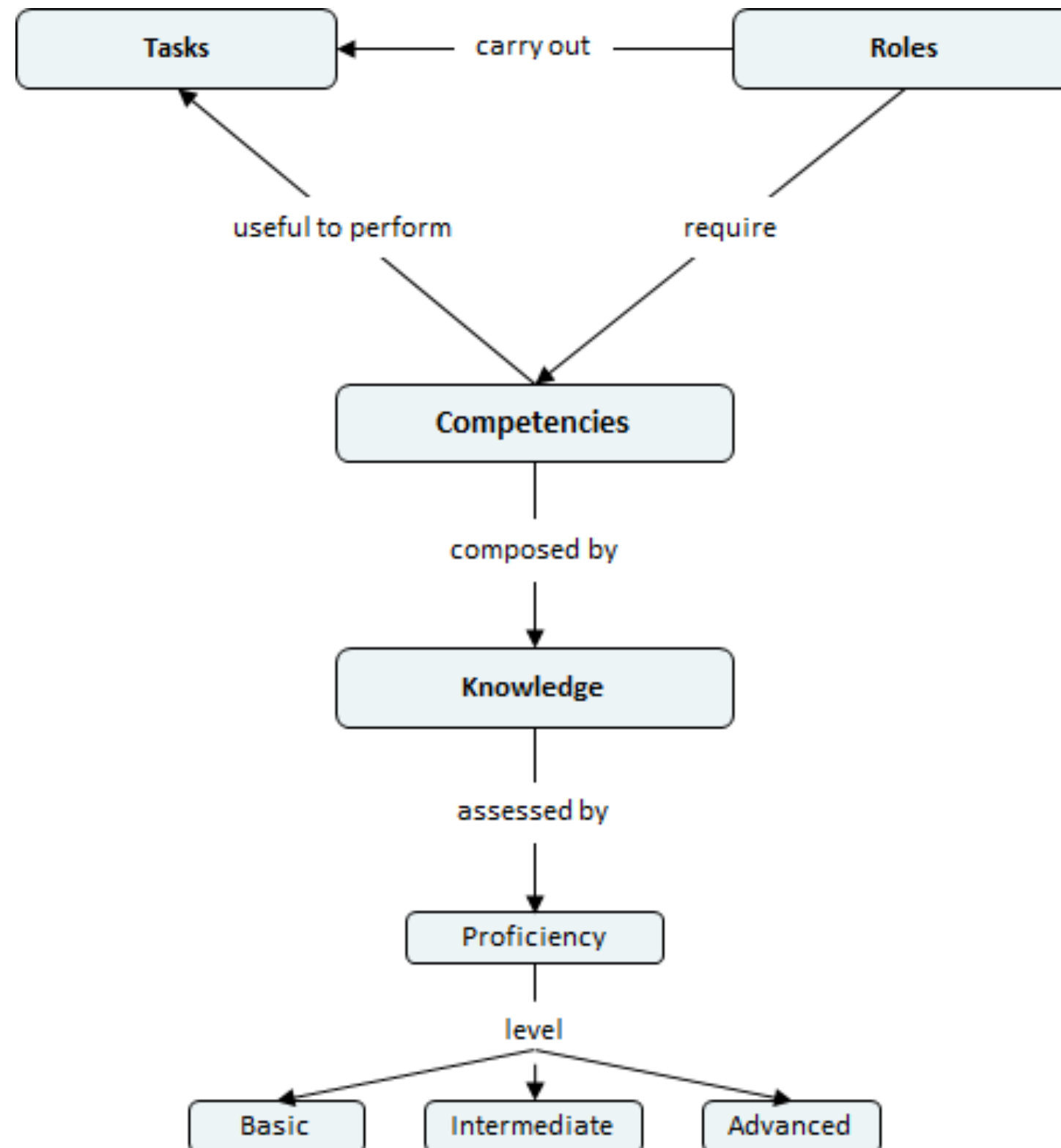
Cybersecurity Competencies Framework

Examples of applications for the Framework, from functional needs and tasks to the design of training paths and search for candidates.

Competencies identification

For each functional need (cybersecurity role or organisational role) and task in scope, identify the required competencies

Knowledge identification

Identification of the knowledge required for the role, for each identified competency

Proficiency level identification

Identification of the level of proficiency required, for each identified knowledge

Design of training paths

Based on the identified competencies, knowledge and proficiency level, create a list of training needs, taking into account current and target levels

Search for candidates

Functional description, for recruitment purposes, based on the identified competencies, knowledge, and proficiency levels

CNCS

C-Academy

- Qualification and Requalification of HR in the competences defined in the National Reference Framework for Cybersecurity (QNRCS).

- Content and training offer aligned with the Cybersecurity Competency Benchmark.

- Offer of certified courses in the training competencies determined from the QNRCS.

- Convergence with the Digital Innovation HUBs (C-HUB), Competence and Certification Centers in Cybersecurity.

- Geographic distribution of the training that allows it to reach all of the national territory.

- Cover at least 9800 trainees by the first quarter (Q1) of 2026.
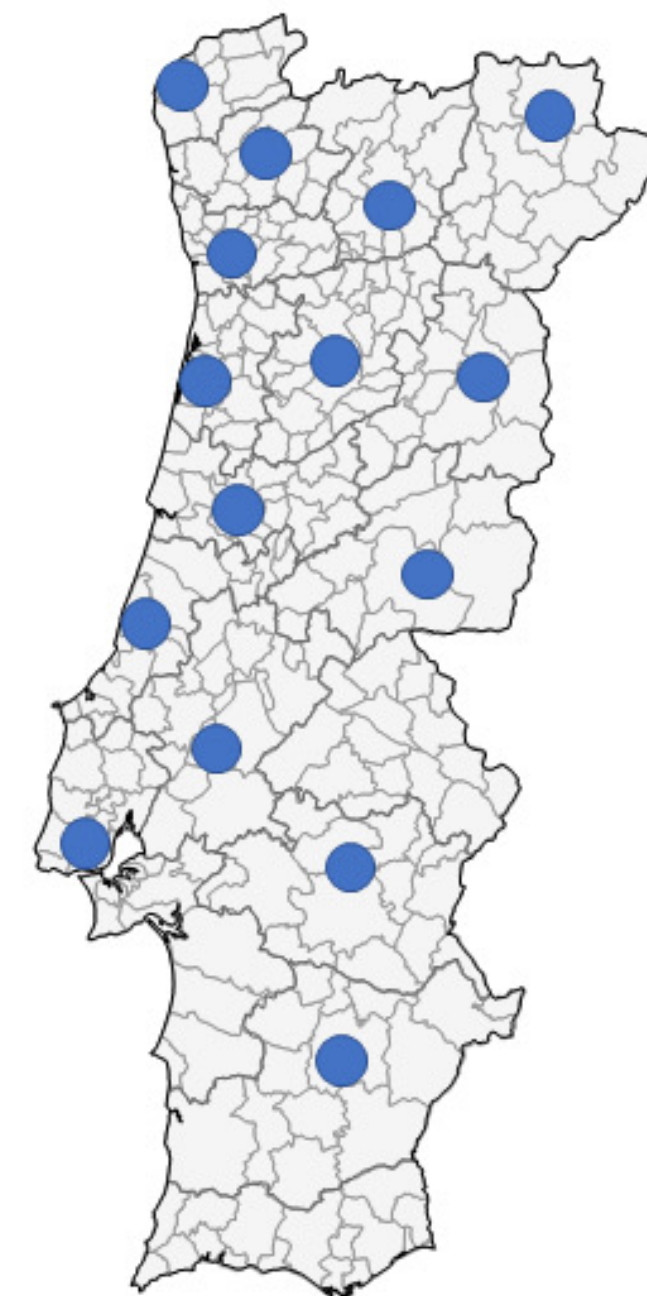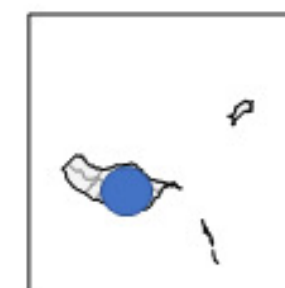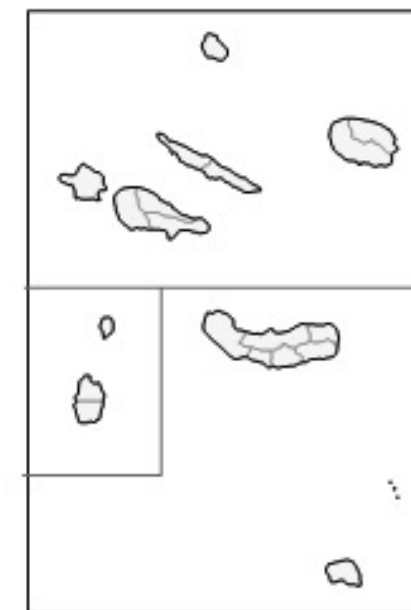
Mapping between C-Academy and ECSF
Level A

TRAINING PATHWAYS OFFERED BY C-ACADEMY – Level A	PROFILES IDENTIFIED IN ECSF
Cybersecurity Training for Executives	_____
Basic Cybersecurity Training	_____

Mapping between C-Academy and ECSF
Level B

TRAINING PATHWAYS OFFERED BY C-ACADEMY – Level B	PROFILES IDENTIFIED IN ECSF
Cybersecurity Trainers	Cybersecurity Educator
Cybersecurity Training for the Workplace	_____
Training for (Cyber) Security Officers	Cyber Legal, Policy & Compliance Officer

Mapping between C-Academy and ECSF
Level C

TRAINING PATHWAYS OFFERED BY C-ACADEMY – Level C	PROFILES IDENTIFIED IN ECSF
Systems and Vulnerability Analyst	Cyber Threat Intelligence Specialist
Security Engineer	Cybersecurity Implementer
Secure Network Architect	_____
Data and Security Manager	_____

Mapping between C-Academy and ECSF
Level D

TRAINING PATHWAYS OFFERED BY C-ACADEMY – Level D	PROFILES IDENTIFIED IN ECSF
Incident Analyst	Cyber Incident Responder
Systems Analyst and Risk Manager	Cybersecurity Risk Manager
Security Architect	_____
Network Systems Security Administrator	_____

Mapping between C-Academy and ECSF
Level E

TRAINING PATHWAYS OFFERED BY C-ACADEMY – Level E	PROFILES IDENTIFIED IN ECSF
Penetration Testing and Vulnerability/Threat Analysis Specialist	Penetration Tester
Forensic Analyst	Digital Forensics Investigator
Security Operations Manager	Cybersecurity Architect

Mapping between C-Academy and ECSF
Level F

TRAINING PATHWAYS OFFERED BY C-ACADEMY – Level F	PROFILES IDENTIFIED IN ECSF
CISO	Chief Information Security Officer (CISO)

Thank you

Isabel Baptista
Isabel.baptista@cncs.gov.pt