Cyber Electromagnetic Activities (CEMA) Awareness

This topic will focus in a variety of research-driven tasks aimed at enhancing situational understanding of the electromagnetic spectrum and its impact on cybersecurity operations. Key activities will include conducting in-depth analysis of cyber-physical systems, exploring vulnerabilities in wireless communication protocols, and investigating electromagnetic interference threats to critical infrastructure.

This task will design a comprehensive cyber-physical picture that represents the perceptions on the physical network layer that consists of the information technology devices and infrastructure in the physical domains that provide storage, transport, and processing of information within cyberspace (networking equipment, end-user devices, physical servers and data centres, radars, communication hardware, etc.). This picture will aggregate the electromagnetic spectrum elements needed for assess Cyber Electro Magnetic Activities (CEMA), like physical and logical devices for spectrum monitoring and management, spectrum analysis, Signal Intelligence (SIGINT), Electronic Attacks (EA), Electronic Protection (EP), measures, etc.

The thesis will also involve the development of risk mitigation strategies, via the collaboration with cybersecurity experts, to research the integration of CEMA in defensive and offensive cyber operations. Furthermore, the thesis will involve staying updated on emerging technologies and threats within the electromagnetic spectrum, contributing to technical reports, and possibly presenting findings to various stakeholders of a European Project.

Cyber Datasets Generation

During this thesis the research activities will focus on the generation of cyber datasets in the context of a European project aimed at enhancing cybersecurity awareness.

The thesis will involve the collection, processing, and analysis of large-scale network traffic data, the simulation of various cyber-attack scenarios, and the development of innovative methodologies for generating synthetic datasets in the full-spectrum cyberspace.

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