Press release
Nota de prensa

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Protecting the Spectrum Users with Internet of Things

Led by IMDEA Networks Institute (a networking research organization based in Leganés, Madrid, Spain), the **SOCRATES** project concluded successfully at the end of October 2021, experimentally showing that **a novel Internet of Things network can be used to protect the spectrum**, identifying and localizing unauthorized transmissions. The project received funding from NATO's Emerging Security Challenges Division – Science for Peace and Security Programme (SPS). The two other collaborating partners on the project were the ElectroSense, a not-for-profit association in Switzerland (a crowd-sourcing initiative that collects and analyses spectrum data), and Katholieke Universiteit (KU) Leuven in Belgium.

The final workshop took place in Leuven, on the 29th of October 2021, with the participation of project members and Dr. Claudio Palestini from SPS NATO. The workshop presented the main achievements of the project as well as the final demonstrator. SOCRATES studied the problem that, in today's society, the wireless infrastructure carries critical services such as the cellular network, aerial communication, and GPS. The spectrum is carefully allocated, with licensed and unlicensed bands, and **any unauthorized transmission or any transmission that does not meet regulatory standards can create havoc**. While in the past, it was difficult to create custom transmissions in the spectrum, and their cost was prohibitive, nowadays the cost of commodity radio technology prices is so low that it can be affordable by any individuals, including malicious intruders.

Dr. Domenico Giustiniano, Research Associate Professor at IMDEA Networks Institute who has coordinated the project, summarizes the main achievements of the project: "SOCRATES is a stepping stone toward an accurate, autonomous, fast and secure system that leverages a novel Internet of Things architecture to protect the spectrum and services and users the depend upon it. The demonstrator presented at the final workshop has shown a **prototype integrated in the Electrosense network**, with the novel capabilities of detecting anomalies in the spectrum, such as an unknown and unauthorized transmission in the spectrum, and finding its geographical location at high accuracy. It has been the result of a joint effort among the three project partners, with **novel hardware designs, algorithms, and implementations that have converged into a final demonstrator**. We thank all project members for the great effort and SPS NATO for supporting this ambitious initiative."

Prof. Sofie Pollin from KU Leuven adds that "With the SOCRATES sensor, we make spectrum analysis affordable for the crowd, and the SOCRATES algorithms have the potential to create spectrum insights that can be useful for many stakeholders." Potential stakeholders of SOCRATES' solutions are **Telecom providers and air traffic controllers**.

Source(s): IMDEA Networks Institute

About us

IMDEA Networks Institute, promoted by the Regional Government of Madrid, is a research organization on computer and communication networks whose multinational team is engaged in cutting-edge fundamental science and technology. As a growing, English speaking institute located in Madrid, Spain, IMDEA Networks offers a unique opportunity for pioneering scientists to develop their ideas. IMDEA Networks has established itself internationally at the forefront in the **development of future network principles and technologies**. Our team of highly-reputed researchers is designing and creating today the networks of tomorrow.

Some keywords that define us: 5G, Big Data, blockchains and distributed ledgers, cloud computing, content delivery networks, data analytics, energy-efficient networks, fog and edge computing, indoor positioning, Internet of Things (IoT), machine learning, millimeter-wave communication, mobile computing, network economics, network measurements, network security, networked systems, network protocols and algorithms, network virtualization (software defined networks – SDN and network function virtualization – NFV), privacy, social networks, underwater networks, vehicular networks, wireless networks and more…

IMDEA Networks Institute
28918 Leganes (Madrid) Spain
Avda. del Mar Mediterráneo, 22

+34 91 481 6210
mediarelations.networks@imdea.org
www.networks.imdea.org

Twitter: @IMDEA_Networks | Facebook | Instagram | Flickr | YouTube