Galileo as a tool to enhance 5G networks cybersecurity

*The ROOT project - **Rolling Out OSNMA for the secure synchronization of Telecom networks** – is testing the new Galileo signal, the so-called OSNMA, in strengthening 5G telecommunication networks against cyber-attacks. Galileo is the European Union satellite navigation system providing advanced services for professional users and consumers with a global coverage.*

Critical and essential infrastructures, such as 5G telecommunication networks, require accurate and reliable time synchronization to provide high-end performances. The required accuracy can be obtained by integrating atomic clocks in the 5G network. This solution allows providers to achieve the needed accuracy but has drawbacks: it lacks in scalability and is not cost-effective. The European satellite navigation system Galileo can provide an innovative and flexible solution. The ROOT project studies how the new OSNMA signal broadcast by the Galileo system can enhance the cybersecurity of 5G networks.

Galileo provides users with information on their position and also on time, on a global scale. High-end satellite navigation timing receivers combined with terrestrial atomic clocks and specific transport protocols can fulfil the stringent requirements posed by 5G networks in terms of time, frequency, and phase synchronisation. As a drawback, the network infrastructure can be exposed to accidental interferences and intentional cyber-attacks. Within this framework, the ROOT project investigates the effectiveness and robustness of innovative countermeasures to satellite navigation systems and cybersecurity threats within a reference network architecture, with particular focus on the use of the new OSNMA signal. OSNMA has been designed to grant to the final users a highly reliable signal, more resistant to natural and intentional interferences. The investigation is pursued through an experimental approach testing the resilience of the 5G network to the most dangerous attacks.

The ROOT team has analysed the state of the art in network architectures and timing distribution, radio frequency attacks to satellite navigation systems signals and cyber-attacks to the 5G networks. Based on this analysis, the team has prepared a detailed planning of the tests and the attacks to be conducted. In parallel, the market opportunities for the final ROOT solution have been investigated and analysed.

The plans for the tests were extremely detailed as a measure to mitigate the risks coming from the COVID-19. One of the main challenges faced by ROOT researchers has been working on a project without meeting in person. Finally, the occasion to be face-to-face has come.

The ROOT team, led by Fondazione LINKS in Torino (Italy), is testing the resilience of the 5G reference network against the selected attacks at Telefonica premises in Madrid (Spain). The tests are carried on with specific devices prepared by Orolia (Spain) and Septentrio's (Belgium) satellite navigation timing receivers have been installed. The attacks have been envisaged by researchers of Politecnico di Torino (Italy) and Fondazione LINKS. The ROOT team is complemented by VVA Brussels (Belgium), whose consultants are assessing the viability of the solution developed in the project and assessing its market potentials.

ROOT activities are now gaining momentum. Stay tuned and visit our website to learn more on the outcomes of the tests!

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