



CLEPSYDRA

NEWSLETTER

BUILDING TRUST IN KEY'S INFRASTRUCTURES



WHY TIMING MATTERS

As critical infrastructures become increasingly interconnected, the need for secure, resilient, and trustworthy timing services has never been greater. Sectors such as telecommunications, energy grids, financial systems and transportation networks all rely on precise time synchronization to ensure safe and continuous operations



THE MISSION

Within this context, the CLEPSYDRA project continues to advance the development of a secure European timing solution based on Galileo, combining innovative technologies to enhance resilience against both cyber and signal-related threats



Together, we are shaping
a **more secure and resilient future**
for Europe.

**POWERING
CRITICAL
SECTORS**



TELECOMMUNICATIONS



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When Timing Fails: Lessons from the Telstra Network Outage

A real-world reminder of why secure and resilient timing
is essential for our digital society.



WHAT HAPPENED?



A recent nationwide outage affecting Australia's largest telecommunications provider, Telstra, highlighted the crucial role that precise timing plays in modern digital infrastructures.

According to Telstra's investigation, the disruption was caused by a timing synchronization glitch within the network rather than by a cyberattack. Although the incident originated from an internal software issue, its impact was widespread, affecting mobile communications, payment systems, transportation services and emergency communications.

IMPLICATIONS



The event demonstrated that even a temporary loss of accurate synchronization can rapidly propagate across interconnected systems, leading to significant operational disruptions.

WHY IT MATTERS



For critical infrastructures, timing is far more than a technical parameter, it is a fundamental enabler of service continuity, resilience and operational reliability. This real-world example reinforces the importance of developing secure and resilient timing solutions capable of maintaining trustworthy synchronization even in challenging operating environments.



At CLEPSYDRA, we are developing a next-generation timing solution based on Galileo and cutting-edge technologies to **strengthen Europe's digital sovereignty** and protect our critical services.



Technology Spotlight: ASPIS – AI-Powered Anti-Spoofing Protection



One of the key innovations integrated within the CLEPSYDRA project is **ASPIS (Advanced Spoofing Protection System)**, a patented technology developed by GEA Space.

ASPIS leverages advanced Machine Learning techniques to detect GNSS spoofing attacks in real time before they can compromise the timing solution.



HOW ASPIS WORKS

Unlike conventional anti-spoofing mechanisms, ASPIS can process both:

- receiver I/Q samples at the pre-correlation level, and
- raw GNSS observables at the post-correlation level,

allowing it to **detect sophisticated spoofing strategies**, including advanced replay and code estimation attacks capable of bypassing conventional authentication mechanisms.



ADVANCED BY DESIGN

The solution is built upon a **multi-layer neural network architecture** specifically designed to provide high detection performance while maintaining computational efficiency.



CONTINUOUSLY ADAPTIVE

ASPIS continuously learns from new attack patterns and is capable of:

- distinguishing genuine GNSS signals from forged signals;
- adapting to emerging threats through Machine Learning techniques.



INTEGRATED PROTECTION

Within CLEPSYDRA, ASPIS operates as an **intelligent protection layer** between the GNSS receiver and the secure timing engine, ensuring that only trusted timing information contributes to the final timing solution.





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Strengthening Critical Infrastructure

The Telstra outage illustrates that timing resilience is no longer a theoretical challenge it is a practical necessity for critical infrastructure operators worldwide.



CLEPSYDRA directly addresses this challenge by combining:



Galileo-based secure timing;



AI-driven spoofing detection through **ASPIS**;



advanced **resilience** mechanisms;



compliance with the European **EN 16605** standard for timing services.



Together, these technologies contribute to the development of a new generation of secure timing solutions capable of supporting critical infrastructures against both accidental failures and intentional signal manipulation.



By transforming advanced research into operational technologies, CLEPSYDRA is helping **build a more resilient and trustworthy timing ecosystem for the future.**



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