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PAVING THE WAY FOR RELIABLE RADIO COMMUNICATION AND CYBERSECURITY FOR  
CRITICAL INFRASTRUCTURE: TU BERLIN'S SALSAT MISSION AND RACCOON PROJECT

**Abstract**

The Technische Universität Berlin (TU Berlin) is working on two projects that aim to enable safe and reliable communication for critical applications. The first project is the SALSAT (Spectrum AnaLysis SATellite) mission, which was launched in 2020. The satellite is equipped with a fully reconfigurable spectrum analyzer SALSA. The mission is an advanced in-orbit testbed to collect and analyze RF spectrum data.

In this paper, the most recent flight results of the SALSAT mission in the UHF amateur radio band will be introduced. The spacecraft has successfully completed the Commissioning and operational improvements have been realized to ease the operations. The mission is currently collecting spectrum samples on a global scale and generating a heatmap for the global frequency usage in the VHF, UHF and S band. All data samples collected throughout the mission duration will be made freely available to the public through a web application.

However, the SALSAT project has also shown a potential increase in communication activity in certain frequency bands, which can lead to unintentional interferences as well as targeted jamming events that can considerably complicate the reliability of space-based solutions. To resolve these issues, TU Berlin is working on the development of the RACCOON (Robust And seCure post quantum COmmunication fOR critical iNfrastructure) project, which aims to combine reliable radio communication and cybersecurity. The goal of the project is to develop an intelligent and robust RF transceiver for the exchange of quantum-safe crypto-keys for critical infrastructure and services (e.g., offshore wind farms).

This paper introduces the technical concept of the RACCOON project and its use case. The RACCOON project is based on a combination of software-defined radio (SDR) technology and post-quantum cryptography algorithms, which ensure that the data exchange is secure and reliable. The ultimate goal is to provide a solution that is resistant to cyberattacks and able to withstand the challenges of the modern networked world.

In conclusion, the SALSAT mission and the RACCOON project are paving the way for reliable radio communication and cybersecurity for critical infrastructure. The SALSAT mission has provided a wealth of data that will be used to improve the utilization of the available communication spectrum, and the RACCOON project aims to provide a robust and secure communication solution for critical infrastructure

and services. Together, these projects have the potential to transform the way we think about radio communication and cybersecurity in the modern world.