SnT 2025 8 SEPTEMBER ONLINE DAY 9 TO 12 SEPTEMBER AT HOFBURG PALACE, VIENNA & ONLINE
CTBT: SCIENCE AND TECHNOLOGY CONFERENCE

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Field Tests of a Data Transmission System for On-Site Inspection

Rémi Colbalchini, Peter Labak, Aled Rowlands, Emilia Koivisto, Nobuo Kimura

Comprehensive Nuclear-Test-Ban Treaty Organization

CTBTO PREPARATORY COMMISSION | PUTTING AN END TO NUCLEAR EXPLOSIONS

INTRODUCTION AND MAIN RESULTS

The section Equipment and Implementation of On-site Inspection (OSI) division of the PTS has entered into a new stage of development of its telemetry solution, also called Data Transmission System in preparation of the next Integrated Field Exercise.

Successive field tests (2023, 2024, 2025) were organized in Austria to validate the configuration and the functionality of the Data Transmission System (DTS).

The field tests results are exposed here to demonstrate how they show advances in OSI operational capabilities.

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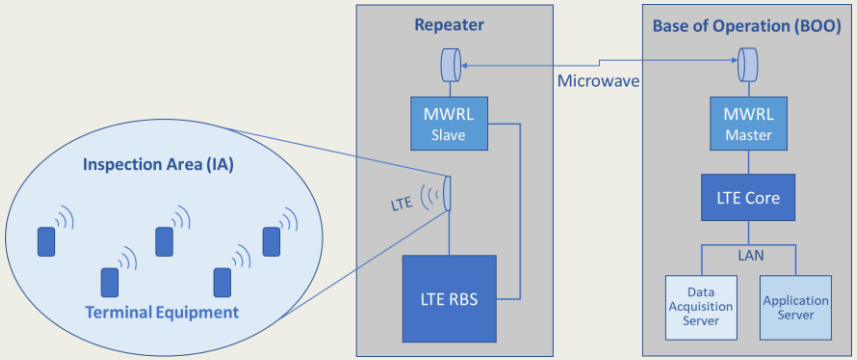
Concept of operations

Data Transmission System is based on LTE technology; it is the most suitable wireless technology for broadband communication. The pilot solution should include:

- LTE Core equipment and application server on Base Of Operation (BOO) site
- Data acquisition server on BOO site
- Microwave Radio link between BOO and Radio site
- LTE Radio base station equipment at Radio site
- Terminal equipment equipped with LTE capability, located in the Inspection Area (IA).



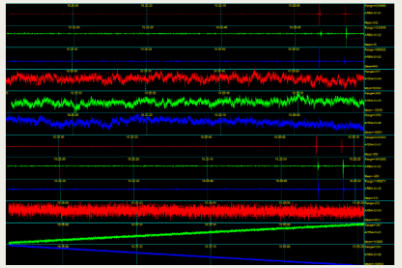
Large Field test in Judenburg – Oct. 2023

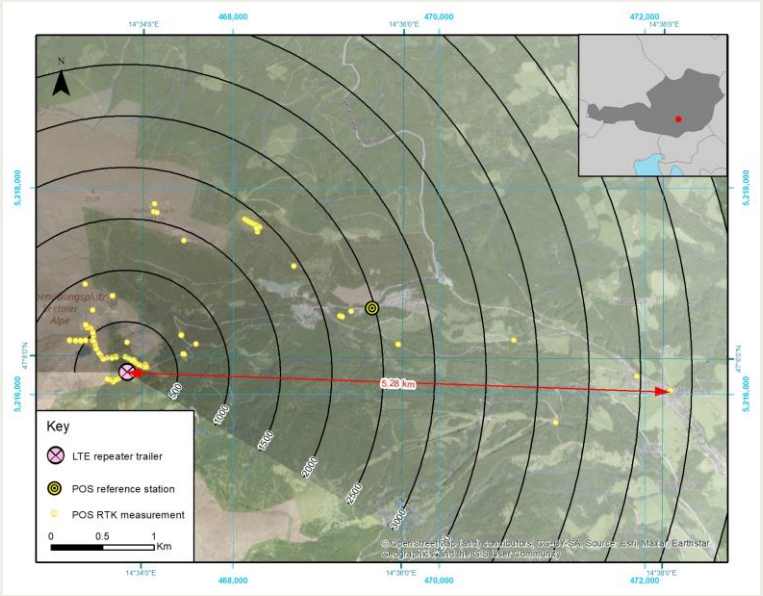
Main achieved results:

- 2.5 km Point-to-point Microwave operational link – 5.6 GHz - 450 Mbps throughput
- LTE network operation in selected frequency bands within B20 – [815 MHz DL 856 MHz UL]
- Extension of coverage (~6km longest attachment and ~ 15 km² coverage in hilly and forest area)
- Full operational mode tested and validated
- Troubleshooting procedures validated
- OSI techniques equipment tested and validated

OSI techniques equipment validated

- Passive seismological monitoring for aftershocks
- Position finding
- Subsoil gas sampling





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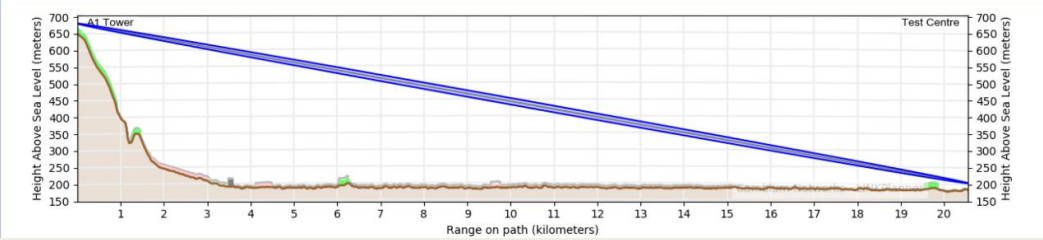
PTP microwave long link test – Oct 2024

Set-up and operation of PTP link in topographic and distance conditions similar to future Field Exercises (Sri Lanka, Nambia) :

FIELD TEST – Link Seibersdorf – Anninger A1 tower	
Distance link	**20.7 km** line-of-sight
Frequency	5.4 Ghz Unrestricted EIRP with Dynamic Frequency Selection (DFS)
Max Transmit Power	27 dBm
Performance throughput	20 Mbits/s



Preparation for IFE and enhancement of capabilities

Upgrade, installation and test of new B3 capabilities
- 3 x Remote Radio Unit for LTE band 3 : 1850 – 1910 MHz UL / 1930 – 1990 MHz DL
- 3 x LTE Sector Antenna 65° MiMo for B3 and B20

=> B30 capability and B20 capability are interchangeable

Introduction and test on small scale (~500m line-of-sight distances) of microwave repeater site.

Preparation for field test in 2025 with the objectives:
- Validation of long-distance microwave repeater site (>25 km line-of-sight)
- Full operational configuration tested and validated
- Use of auto-peak alignment for PTP antennas
- UPS operation in maximum power