Special Session on

Cellular Ad Hoc Networking for Connected Mobility

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Abstract: This proposal describes a Special Session titled "Cellular Ad Hoc Networking for Connected Mobility" at the 9th International IEEE Conference on Models and Technologies for Intelligent Transportation Systems (MT-ITS). This session will present the main concepts, use case, and results of the ANR-FNR-funded project CANDI⁴ (Cellular Ad Hoc Networking for Decentralized IoT Architectures), which developed solutions to enable multi-hop UE-to-UE relaying for next-generation decentralized cellular networks.

I. AIM AND SCOPE

Traditionally, cellular networks have been designed based on centralized architectures. More recently, an emerging class of automotive and ITS use cases, requiring direct communication between nearby devices has triggered the first paradigm shift in the cellular networking domain, enabling device-to-device (D2D) communication capabilities. Emerging revolutionary connected transportation and ITS applications, such as disaster first responders, virtual train coupling, smart factories and agriculture, and advanced air mobility or maritime logistics, are triggering a second cellular paradigm shift toward industrial wireless grade *multi-hop* device-to-device communications. Several challenges such as decentralized industrial IoT architectures, opportunistic service discovery, ultra-reliable & low-latency distributed resource allocation, service dependability, and time sensitive networking need to be addressed to provide ITS stakeholders with trustworthy decentralized cellular ad-hoc networking solutions.

This session presents the main results of the two-year CANDI project, which aimed to address some of these challenges and enable multi-hop UE-to-UE relaying for next-generation decentralized cellular networks. The session will include presentations of theoretical concepts and architectures developed by CANDI considering virtual train coupling as a use case, simulation-based performance evaluation results, and a proof-of-concept prototype based on an Open5G platform called OpenAirInterface⁵.

II. PRELIMINARY PROGRAM

- Keynote (TBC)
- Joint scheduling and relaying in 5G NR Sidelink
- Enabling 5G NR Sidelink communication in OpenAirInterface.
- Live Demo

III. PROJECT SPONSORING THE EVENT

INTER/ANR/22/17192457/CANDI

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⁴ <u>https://www.candi-project.eu/</u>

⁵ <u>https://openairinterface.org/</u>