6G-empowered Robotic Vehicles for Sustainable Development (VeSUS)

The increasing interest in robotic vehicles has demonstrated they could be a game-changer to achieve the UN's Sustainable Development Goals (SDGs), also known as Agenda 2030. Robotic vehicles come in many shapes including unmanned aerial vehicles (UAVs), unmanned ground vehicles (UGVs), autonomous underwater vehicles (AUVs) and Autonomous Electric Vehicles (EVs) across the space-air-ground-water medium. UAV delivery has the potential to halve carbon emissions compared with small cargo vans; robotic taxis (e-mobility) could alleviate traffic congestion and increase sustainability in urban areas, and UUV can help clean the ocean by discovering and picking up plastic waste.

The emerging 6G technology can further boost the capabilities of robotic vehicles. For instance, integrated sensing and communication (ISAC) can improve navigation and target tracking of UAVs in poor GPS environments; mobile holograms could reshape the interaction between humans, robotic vehicles, and the cyber world.

VeSUS workshop focuses on achieving sustainable development based on progress in at least one of the three areas: the economy, society, and the environment. The workshop is particularly interested in 6G-empowered robotic vehicle technologies that drive sustainable infrastructure design and deployment in the Internet of Things (IoT) for sustainability, energy efficiency, smart cities, intelligent transportation systems, agriculture, natural conservation, ocean waste cleanup and end-of-life care improvement.

In this context, VeSUS aims to assess the capabilities of 6G to support robotic vehicles in sustainable development. This includes designing more sustainable, ecological and efficient robotic vehicle sensing, computing and communication approaches. First, the workshop will discuss opportunities and challenges of deploying robotic vehicles in diverse scenarios and identify key performance indicators (KPIs) to reflect sustainable design requirements. Second, the workshop will investigate novel 6G approaches to address the challenges and hit the KPIs. This allows us to push the physical limit of robotic vehicles and enable them to adapt to complex environments reliably, agilely and energy efficiently.

Original contributions are solicited in designing, developing and evaluating 6G-empowered robotic vehicles. Potential topics include, but are not limited to:

- Use case studies of robotic vehicles for sustainable development
- 6G-empowered robotic vehicle sensor networks
- Networking architectures and communication protocols for robotic vehicles
- Machine learning and AI for robotic vehicles
- Cloud/fog/edge computing intelligence in robotic vehicles
- Data gathering and aggregation approaches in robotic vehicles
- Self-organizing/self-healing coordination and communication for multi-robotic vehicles
- Energy-efficient sensing, computing and communication for robotic vehicle networks
- Distributed control and collaboration for robotic vehicles
- Biologically inspired communication systems for robotic vehicles
- Software-Defined robotic vehicle networks
- Path planning, navigation and target tracking in robotic vehicles networks
- Quality of service/quality of experience in robotic vehicles
- Cybersecurity and privacy in robotic vehicles
- Performance analysis and experimental demos of robotic vehicles for sustainable development