

## SHORT TERM SCIENTIFIC MISSION (STSM) SCIENTIFIC REPORT

This report is submitted for approval by the STSM applicant to the STSM coordinator

**Action number: CA15127 (RECODIS)**

**STSM title: Efficiency of radio communications in wireless mesh networks (WMNs) under weather disruptions**

**STSM start and end date: 01/03/2019 to 07/03/2019**

**Grantee name: Jacek RAK**

### PURPOSE OF THE STSM:

The purpose of this STSM was to analyse the vulnerability links of wireless mesh networks with radio links to weather-induced disruptions, e.g., due to fog or rain. A particular focus was on providing the advancements of the chapter entitled “Optimization of wireless networks resilient to adverse weather conditions” in particular in the context of wireless radio links (the respective sections 5-6 of the chapter). Another objective was to investigate the vulnerability of wireless links between the infrastructure nodes and the mobile nodes (vehicles) to contribute to another chapter of the final RECODIS book with a draft title “Design of Resilient V2I Infrastructures”.

### DESCRIPTION OF WORK CARRIED OUT DURING THE STSMS

During this STSM, the focus was on the completeness of the content of sections 5-6 of the RECODIS book chapter on “Optimization of wireless networks resilient to adverse weather conditions” as well as on developing the section of a chapter on “Design of Resilient V2I Infrastructures” related to design methods to determine the location of Road-side Units and gateways in the V2I scenario.

### DESCRIPTION OF THE MAIN RESULTS OBTAINED

This STSM has resulted in advancements of two chapters of the RECODIS book:

- 1) “Optimization of wireless networks resilient to adverse weather conditions” concerning the sections on:
  - a) Robust Optimization of WMN including the basic optimisation model and solution algorithm
  - b) Numerical studies for a reference PMAN network
- 2) “Design of Resilient V2I Infrastructures” concerning its section on “Planning the roadside infrastructure for reliable vehicular communications” and, in particular, the preparation of sections on:
  - a) Deployment of Gateways to Minimize the Average Hop Count for Internet-related Traffic
  - b) Deployment of RSUs Based on Location-dependent Road Traffic

**FUTURE COLLABORATIONS (if applicable)**

The future collaboration of the STSM grantee with the team from Lund University, Sweden, is foreseen concerning possible joint research works in the area of resilient wireless networks.