# SHORT TERM SCIENTIFIC MISSION (STSM) – SCIENTIFIC REPORT

## The STSM applicant submits this report for approval to the STSM coordinator

**Action number: CA15127**
**STSM title: A Numerical Study of FSO Wireless Mesh Networks Resilient to Adverse Weather Conditions**
**STSM start and end date: 01/03/2019 to 10/03/2019**
**Grantee name: Michal Pioro**

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**PURPOSE OF THE STSM**

(max. 500 words)

The purpose of this STSM was to apply an AMPL/CPLEX-based optimization model elaborated during my previous STSM in Lund (January 18-24, 2019) in order to dimension an instance of an FSO-based Wireless Mesh Networks (WMN) resilient to adverse weather conditions. Such an instance (Paris Metropolitan Area network – PMAN) was also prepared during than STSM. The resulting numerical study will constitute an important part of our contribution to the RECODIS final book.

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**DESCRIPTION OF WORK  CARRIED OUT DURING THE STSM**

(max. 500 words)

During the STSM, the following two research tasks were accomplished:

- The previously prepared instance (i.e., PMAN) was adjusted to fit the current version of the FSO optimization model taking into account full-duplex links and symmetric traffic matrix.
- The previously elaborated AMPL/CPLEX-based optimization model for FSO-based WMN was improved in terms of efficiency, and applied to the adjusted PMAN instance. This resulted in a numerical study that illustrates the efficiency of the optimization model in a comprehensive way.

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**DESCRIPTION OF THE MAIN RESULTS OBTAINED**

(max. 500 words)

The major result of the STSM is a comprehensive numerical study of a realistic metropolitan FSO network.

The results achieved during the STSM form the basis for the final version of Chapter 3.11 (devoted to optimization of mesh networks resilient to weather condition) in the RECODIS book "Guide to Disaster-

resilient Communication Networks".

**FUTURE COLLABORATIONS (if applicable)**

(max. 500 words)

I look forward to the further collaboration with Lund University in the field of resilient wireless networks optimization during this COST action.