SHORT TERM SCIENTIFIC MISSION (STSM)
SCIENTIFIC REPORT

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

Action number: **CA15127 - Resilient communication services protecting end-user applications from disaster-based failures (RECODIS)**
STSM title: Analysing cascading effects in cyber-physical systems
STSM start and end date: 02/09/2019 to 08/09/2019
Grantee name: Sandra König

PURPOSE OF THE STSM:
(max.200 words)

The purpose of this STSM was to draft an article describing how a theoretical model of cascading effects in cyber physical systems can be put to practice. The article is anticipated to contribute as a chapter to the RECODIS book of the Action since it considers multiple and correlated failures in 'hybrid' systems (e.g., communication systems, cyber systems, physical infrastructures). The chapter will have a tutorial style to increase acceptance among end users and provides the basis for a more detailed case study, which will investigate ways to protect container terminals in ports.
Furthermore, the STSM was aiming to maintain the good collaboration between Lancaster University and AIT through discussions with colleagues and new members on their current and planned future work and consideration of future collaborations in research publications, project proposals, etc.

DESCRIPTION OF WORK CARRIED OUT DURING THE STSMS
(max.500 words)

During the STSM the following tasks have been carried out:
1. Thestructure of the article has been chosen such that the application of the theoretical model is described step by step, targeting both applied researchers and ptarctitioners.
2. A scenario that can be used as a running example illustrating every step has been defined. This scenario is kept simple to allow the reader to focus on the overall process but is inspired by a real incident in a port. It can be expanded if more detailed knowledge is available (this is planned future work).
3. Both the model to be applied and the running example are described and put in a larger context.
4. Each step of the proposed procedure is described in words, including comments on the expected effort needed to collect required data and methods of parameter estimation.
5. Each step is illustrated with the running example. This includes a graph representation as well as discussions on the choice of parameters of the model. A simulation of the scenario shows how the cascading effects can be estimated. The simulation tool (developed during the corresponding EU project) is described in the paper and screenshots of the tool demonstrate its use.

Besides the work on the book chapters, there were discussions with colleagues on their current research agendas and on potential future collaboration in research publications and project proposals.

DESCRIPTION OF THE MAIN RESULTS OBTAINED

The result of the STSM is a draft of the planned book chapter that will be finalized soon. A specific scenario has been discussed and simulated to illustrate the applicability of the mathematical model.

FUTURE COLLABORATIONS (if applicable)

Based on the work done during the STSM, a follow up research paper that will elaborate on a case study is planned. The case study will follow the process described in the book chapter but will include more (technical) details on a container terminal operating in a port.