Secondment report

Name: ESR1.5 Thomas Lange
IRP title: **Reliable operation infrastructure for dynamic, high-dependability applications**
From: iROC
To: PDT
Period: April - September 2018 (split over several weeks, 2M in total)

Activities during the secondment

- **Scope and objectives.**
  The secondment at PDT was following two main objectives:
  1. To develop new models and assessment techniques for transient faults in FGPAs.
  2. To attend courses provided by the university.
- **Activities.**
  Before the secondment, the ESR was involved in several activities related to characterize the radiation sensitivity of different electrical components. One of the tested devices was the Xilinx UltraScale+ MP-SoC FPGA which is of particular interest for the FPGA research community, due to its new technology and performance. During the secondment at PDT a detailed analysis of the radiation campaign results was performed. Thereby, the data obtained from the radiation test campaigns were compared to a novel error rate estimation approach for SRAM-based FPGAs which combines SEU and SET effects in the FPGA's configuration memory and the user logic. This approach and results of the comparison with the real radiation test data was published in a paper and presented by the ESR at the AHS 2018 conference.

  The ESR is enrolled in the PDT's doctoral school. In order to complete the PhD, it is mandatory to attend to a specific number of courses provided by the university. Therefore, the ESR attended the Reconfigurable Computing and Mimetic Learning course. The knowledge obtained at the Mimetic Learning course was applied in later studies.

- **Main results achieved.**
  - Develop a new error rate estimation approach for SRAM-based FGPAs and verified against data obtained from radiation test campaigns. Published a paper: "L. Sterpone et al., "A Novel Error Rate EstimationApproach forUltraScale+ SRAM-based FPGAs," in 2018NASA/ESA Conference on Adaptive Hardware and Systems (AHS),2018, pp. 120–126.
  - Attended university courses and successfully passed the exams.

- **Next steps.**
  There are no next steps planned.

Self-evaluation

Overall score: 4
I consider this secondment successful, with regards to the research objectives achieved, skills developed, supervision quality, diversity of the resources. (Agree = 5 … Disagree = 1)
Optional comments: None

Date of the report approval by the supervisor: 14/11/2019

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