

Low Level RF Workshop 2022



9-13 Oct 2022, Brugg-Windisch, Switzerland



Contribution ID: 24

Type: **Oral**

Signal Processing Development Methodologies for FPGA Platforms using Reusable and Generic PSI Library components

Wednesday, October 12, 2022 12:05 PM (15 minutes)

Over the past ten years, two digital LLRF systems (SwissFEL, HIPA) with FPGA based digital signal processing (DSP) have been developed at PSI and the third for SLS-2 is underway. Other accelerator systems such as beam diagnostics also use FPGA platforms for their DSP. Even though there are large differences in the applications even between the LLRF systems, many similarities in the underlying DSP algorithms exist. It was observed that not many blocks of the various FPGA signal-processing developments could be reused due to the lack of genericity, so it was decided to create a library with basic DSP blocks and fixed-point arithmetic units.

In this contribution, the PSI Open-Source FPGA DSP libraries and development methodologies applied as example in the HIPA and the SLS-2 LLRF systems are introduced. The presented approach demonstrated the productivity increase by the means of non-regression test and reliability because of their use to all range of application in accelerators.

Primary author: STEF, Benoit (PSI - Paul Scherrer Institut)

Presenter: STEF, Benoit (PSI - Paul Scherrer Institut)

Session Classification: Open Hw-Fw-Sw

Track Classification: Low Level RF Workshop 2022