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PCB-level modularity exemplified by the Serenity-S1 ATCA board

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In the context of the back-end processing system for the CMS Phase-2 upgrade, the Serenity-S1 has been designed as a common data processing blade for various sub-detector systems with a single FPGA configuration in the ATCA form factor.

The Serenity-S1 and Serenity-D1 are the production cards of the Serenity family. Both boards will use a common service area that provides the infrastructure needed to fulfill the ATCA requirements and the slow control of the board through a Xilinx KRIA System-on-Module. In the payload area of the Serenity-S1, which is close to submission, a single FPGA and several optical links are located. As an evolution, the Serenity-D1 will have two FPGAs with their corresponding optical links.

This presentation focuses on the fragmentation of the board and the use of modularity to facilitate the design process from Serenity-S1 to Serenity-D1 and the future development of other ATCA systems. Furthermore, some advice is given on how to design for modularity in the electronic design automation (EDA) tools Altium and KiCAD.

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