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The VERITAS Digital Asynchronous Transceiver

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Abstract content

The VERITAS array trigger requires a simultaneous coincidence between multiple telescopes to initiate the readout of data and is essential to reducing the overwhelming background of local muons whilst efficiently recording light from VHE gamma ray initiated air showers. The selection of coincident events in hardware reduces the overall trigger rate allowing the individual telescopes to trigger at lower thresholds, decreasing the energy threshold of the system. Short asynchronous pulses, serial event-numbers and long status flags must be distributed over hundreds of meters between the central building and each telescope and at least 5 channels of communication are needed in each direction. Coaxial cable cannot be utilised over the required distances and a serial, sequentially implemented, distribution scheme is undesirable as the dead time of the trigger system must be kept to a minimum. Instead a digital asynchronous transceiver (DAT) employing parallel optical link technology has been developed. Combinatorial logic functions are implemented in Xilinx Spartan-3 FPGAs, providing a versatile solution capable of transmitting data asynchronously on each of 11 channels with nanosecond accuracy and incurring no dead-time. The laboratory performance and integration of the DAT modules into VERITAS are presented and the benefits and draw-backs of this novel approach discussed.

If this papers is presented for a collaboration, please specify the collaboration

Summary

Reference

Proceedings of the 30th International Cosmic Ray Conference; Rogelio Caballero, Juan Carlos D'Olive, Gustavo Medina-Tanco, Lukas Nellen, Federico A. Sánchez, José F. Valdés-Galicia (eds.); Universidad Nacional Autónoma de México, Mexico City, Mexico, 2008; Vol. 3 (OG part 2), pages 1527-1530

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