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Status and Perspectives of the Real-Time Control of VIRGO Gravitational Waves Detector

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The Advanced VIRGO detector is currently taking data during the second part of the fourth observation run called O4b, which began last April and is scheduled to finish in spring 2025. In order to detect gravitational waves, VIRGO uses a complex real-time control system consisting of 135 multicore DSP processors and more than 1,000 channels of high-resolution analog inputs and outputs. In this talk we summarize the main requirements with associated technical choices focusing mainly on electronic hardware, entirely designed and produced by INFN. We also presents our plans for upcoming upgrades targeting next VIRGO observation run O5 and that will also lead to the conceptual design of the control system for the third-generation ground based detector Einstein Telescope.

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