USAGE OF FPGA IN DATA acquisition AND PROCESSING SYSTEMS DEVELOPMENT PROCESS IN ACCORDANCE WITH ITER PROJECT REQUIREMENTS [[1]](#footnote-1)\*)

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Usage of controllers with Field-Programmable Gate Arrays (FPGAs) is planned in ITER diagnostics’ data acquisition and processing systems. Among such devices, National Instruments FlexRIO has the most widespread distribution and support in the ITER project.

This class of devices allows developer to solve various problems associated with high performance and experimental data processing with great accuracy. FPGA-based devices provide an excellent basis for building systems with ADCs, DACs, signal generators, oscilloscopes, and other devices. In addition, there is a process for developing custom devices to work with NI FlexRIO.

The report provides a consistent description of the system development process using FPGA devices and their integration into the CODAC Core System. The basic principles of creating FPGA-level programs in LabVIEW language, the process of transferring FPGA firmware to Linux Red Hat OS, the creation of special NDS programs necessary for binding FPGA variables with the EPICS database and their integration into fast controller software are described. Understanding and observing the approaches proposed by ITER and National Instruments for the development of comprehensive technical systems using FPGAs should simplify the development of high-performance data acquisition and processing systems and open up new opportunities for developers to solve complex problems.

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1. \*) [abstracts of this report in Russian](http://www.fpl.gpi.ru/Zvenigorod/XLVII/E/ru/JF-Nagornyi.docx) [↑](#footnote-ref-1)