USage OF FAST AND SLOW CONTROLLERS IN ITER DATA acquisition AND CONTROL SYSTEMS [[1]](#footnote-1)\*)

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The ITER project involves many diagnostic systems, each of which contains a data acquisition and control system. One of the key things responsible for the data acquisition and control systems implementation are programmable controllers. The controllers in the ITER device information system are divided into “slow”, “fast” and “other” - devices that are not unified in the ITER project. Controllers are called fast, in which the response time is less than 10ms, used to collect and process scientific data. The term "slow controller" is used for controllers responsible for industrial systems: maintaining a vacuum, water cooling, steam control, etc. Slow controllers are responsible for interrogating sensors, controlling actuators, and monitoring industrial equipment.

In the data acquisition and processing systems involving fast controllers, FPGA, PXI / PXIe and CODAC Core System SCADA technologies are used. They simplify the integration of equipment into diagnostic systems and enable easy reconfiguration of devices. This report examined an example of integrating the NI FlexRIO 7966R into the CODAC Core System. To ensure the connection between the variables in the FPGA firmware and the variables of the SCADA system database, specialized software is needed that can be created using Nominal Device Support v3, a unified structure that simplifies the support of devices for data or image acquisition, and time synchronization. The report outlines the process for creating such software.

One example of slow controllers’ usage in data acquisition systems is equipment monitoring. Since most of the equipment is located in specialized cubicles, a subsystem that allows you to monitor the condition of the equipment included in the assembly is needed. The hardware for this system is a part of the core control system components provided by the cubicle designer. The main controller is the S7-1200 PLC, which has sufficient functionality to meet the needs of monitoring systems of any complexity. The report examined the process of integrating slow subsystem controllers into the CODAC Core System.

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