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## P2.150 Remote diagnostics application software for remote handling equipment

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ITER Remote Handling equipment controllers provide measurement and diagnostics data about the remote handling equipment and devices they control, about themselves and their operating environment. This information is aimed for the RH operators to reduce downtime of the Remote Handling systems by anticipating maintenance needs and failure conditions.

In this paper, the development of the Remote Diagnostics Application (RDA) software for the analysis and archiving of diagnostics data is presented. RDA aims to become one of the standard High-Level Control System applications of the ITER Remote Handling Control System.

RDA provides a basic set of diagnostics tools for the ITER RH operators that can be extended for specific RH equipment needs. For that purpose, RDA facilitates runtime incorporation of LabView Visual Instruments addressing specific diagnostics cases not presumed at the time of RDA programming. This has been achieved by a three-layered architecture: RDA Framework, its Diagnostics Workbenches and their Diagnostics Primitives. The RDA Framework incorporates a user interface that can load one or several special diagnostics cases implemented as custom Diagnostics Workbenches with their own GUI layout and custom or default Diagnostics Primitives, which can be rules, analysis functions, filters, etc.

RDA has the following features by default:

- data collection from RH equipment controllers into 8-hours local cache. RDA communicates with the equipment controllers through the Controller Interface Protocol (CIP)
- time domain plotting of data (trends)
- frequency domain analysis (spectra)
- amplitude domain analysis (histograms)
- scatter plots
- cross-correlation plots
- archiving and retrieval of history data (using HDF5 files).

As a result, RDA enables full exploitation of the LabView Toolkits and Modules and facilitates the implementation of complex and dedicated diagnostics and prognostics for the RH operators to:

- monitor performance data;
- run diagnostics tests and rules on equipment systems;
- analyse historical data.

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