Documentation workflow for Instrumentation and control of iter subsystems

Mironova E., Portone S., Marusov N., Semenov I.

«Project Center ITER» Russia, Moscow, Kurchatov sq, 1, bld.3
 e.mironova@iterrf.ru, s.portone@iterrf.ru, n.marusov@iterrf.ru, i.semenov@iterrf.ru

ITER instrumentation and control system (ITER I&C) consists of control and data acquisition system CODAC (CODAC - Control, Data Acquisition and Communication), the system interlocks and protection of equipment CIS (CIS - Central Interlock System) and safety system for people and environment CSS (CSS - Central Safety System). The main objective of ITER I&C - providing a fully integrated management of the ITER.

Because of ITER is an international project and subsystems will be delivered by various participants, correct approach for documentation of the individual subsystems I&C plays an important role.

When you create a control subsystem you should follow certain guidelines.

The first step of describing the subsystem's I&C is to create a process diagram of its operation. This diagram should describe the internal logic of subsystem.

The next step – software functional breakdown. Top level functions may be the same for different subsystems. For example, for diagnostics following set of top-level functions is proposed: Global, Signal Conditioning, Data Acquisition, Data Processing, System management, Operation, Machine Protection, Safety and Interface. Top-level functions are broken down into sub-functions as long as they do not become elementary ( 4-5 levels ) and allow to define specific variables .

Based on the number of variables and signals in the subsystem, layouts of the controllers and computer processing units can be planned. So the next stage - description of the subsystem architecture (hardware complex realizing subsystem operation). It is also necessary to create the layout of the equipment in cubicles.

For each variable in the system should be defined rules of access to it, i.e. from which of local networks we can get its value. Thus, we get lists of variables (part of Interface Sheet) for each network which system is connected.

The final step is to describe the subsystem states in the form of a tree structure with logic links from state to state.

The report provides an overview of the documentation workflow for ITER subsystems I&C, based on the experience of interaction of Project Center ITER employees with ITER IO colleagues.

The report will be interesting for ITER subsystem's developers, as well as for engineers and technical persons involved in the creation of large fusion installations.