Integration Challenges for the ITER Industrial Control Systems

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The ITER Instrumentation and Control (I&C) team is responsible for the integration of approximately 37 sub-systems with instrumentation and control. Each sub-system, when delivered will have a set of autonomous controls developed to manipulate and monitor it. These “Plant Systems” will be developed by the ITER Organization Central Team (IO-CT) as well as the seven Domestic Agencies associated with the project. Further, the work has been apportioned to over 200 sub-contractors spread around the world.

In order to ensure consistency across these diverse organizations, IO-CT has developed the Plant Control Design Handbook (PCDH). This guide recommends hardware and software tools as well as design methodologies to promote consistency project wide. Additionally the Control Systems Division (CSD) at IO has developed an integration kit with basic hardware and a preconfigured development environment. And provides training on a regular basis. However with so many engineers developing I&C solutions in so many places in support of the ITER project it is difficult to judge how well our partners understand and adopt our recommendations.

In the end IO-CT will take ownership of the individual systems and the controls associated with them. Once they reach their final destination we will need to integrate these devices into one centrally controlled scientific instrument for use by investigators from around the world. That integration challenge is the subject of this discussion.