Contribution ID: **35** Type: **Oral**

Current developments on ASDEX Upgrade data acquisition systems

Wednesday, 7 July 2021 14:40 (10 minutes)

The ASDEX Upgrade diagnostics have provided scientists with the experimental data required to advance the fusion field for 30 years. In this time, the systems and diagnostics of the machine have evolved. Many solutions combined commercial products with in-house productions of state-of-the-art data-acquisition hardware. However, with the ever-increasing advances of the computing industry,and the long-run of the fusion machines it is not uncommon to find dated systems working with more modern systems. At some point a line has to be drawn and systems updated to support newer architectures, which provide access to more modern tools. Nevertheless, simply re-writing otherwise functional programs is not always feasible or effective. For the ASDEX Upgrade diagnostics the time has come to undo this entanglement and draw a clear strategy for modern data acquisition systems. The Discharge Control System (DCS) team at ASDEX Upgrade has already advanced on this work by providing clear development and integration pipelines to some of the ASDEX Upgrade diagnostics, but to supply current diagnostics with modern DAQ systems (in the order of 100's) more robust tools were required. We introduce new data acquisition plan using standardization layers based on the ITER Nominal Device Support (NDS v3). These frameworks are often used to plan highly modular and maintainable systems looking at the future, but in this case, these same traits help modularize and integrate existing systems. New diagnostics access modernized systems integrated using NDSv3, meanwhile old diagnostics, that may be replaced in a more staggered manner, benefit from the new systems adopting a simple communication layer or a C++ wrapper on the otherwise perfectly functional C driver of the old diagnostic. The new communication interfaces are standard and re-used by any NDS driver, saving time and also allowing for future developments of drivers to connect both to the real-time or standard ASDEX Upgrade diagnostics networks. The work presents the status as well as plans for the fully deployed new diagnostics, together with the development, test, and deployment strategies, bringing ASDEX Upgrade diagnostics to the most modern standards. A prototype system was built with the mentioned technologies and using CentOS and preliminary conclusions are presented.

Member State or IGO

European Union

Speaker's Affiliation

Max-Planck-Institut für Plasmaphysik (IPP), Garching, Germany

Primary authors: Mr ASTRAIN, Miguel (Max-Planck-Institut für Plasmaphysik (IPP)); Dr MICHELINI, Mario (Max-Planck-Institut für Plasmaphysik (IPP)); SIEGLIN, Bernhard (Max-Planck-Institut for Plasma Physics); FUCHS, Christoph (Max-Planck-Institut für Plasmaphysik); Dr RAUPP, Gerhard (Max-Planck-Institut für Plasmaphysik (IPP)); ASDEX UPGRADE TEAM (Max-Planck-Institut für Plasmaphysik (IPP))

Presenter: Mr ASTRAIN, Miguel (Max-Planck-Institut für Plasmaphysik (IPP))

Session Classification: Remote Experimentation and virtual lab 2

Track Classification: Remote Experiments and Virtual Laboratory