

## EPICS Collaboration Meeting September 2022



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# Study on EPICS Communication over Long Distance

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The operation of ITER is expected to happen not only directly in the ITER control room, but also to benefit from human capital from around the globe. Each ITER participating country could create a remote participation room and follow the progress of experiments in relatively real time. Scientists from all over the world can collaborate on experiments at the same time as they are performed. This is called “remote participation” in ITER.

ITER control system is based on EPICS. It is thus natural to try to extend EPICS use to remote participation sites. The authors designed tests to find out how EPICS performance depends on network performance, with the goal of understanding if an EPICS-based application can be used directly on the remote side. A special test suite has been developed to see how many process variables (PVs) remote participants can use if they run their local operator screens or independent applications. Remote test participants were connected via a dedicated VPN channel and were 2,600 km and 9,700 km away. The test exercised reading of large number of PVs –up to 10 000 –with an update frequency of up to 10 Hz, short time and also for long periods up to 24 hours. The performance was compared with equivalent execution in a local network.

With a large number of PVs and their frequent updating, the latency of updates on the side of the remote participant, adjusted to the static network delay due to distance, was demonstrated to be comparable to the latency of local execution. This suggests that EPICS over long distance is quite usable for the purpose of ITER remote participation tasks.

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