A Vision for a Collaborative Control Room for ITER*

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This paper presents a vision for a collaborative control room for ITER that will support worldwide experimental operation. ITER will be the largest and most expensive scientific instrument ever built for fusion research. A unique feature in the operation of fusion energy experiments is the requirement to access, analyze, visualize and assimilate data, between shots in near-real-time, to support decision making during operation. Fusion experiments put a particular premium on near real-time interactions with data and among members of the team. Enabling effective international collaboration on this scale is technically demanding, requiring powerful interactive tools and provision of a working environment for off-site personnel engaged in experimental operations that is every bit as productive as what is on-site. To meet this challenge the vision is divided into two main elements, collaborative workspaces and secure computational services. Collaborative workspaces provide for a flexible, standards-based collaboration space, which includes advanced tools for ad hoc and structured communications, shared applications and displays, and enhanced interactivity for remote data access applications. Secure computational services support the needs of the ITER control room by providing high performance worldwide data analysis in a flexible security environment. While the worldwide fusion program has a significant track record for developing and exploiting remote collaborations, the enhancements required for ITER are considerable and the technologies developed should be prototyped and tested on the current generation of experiments and numerical simulation projects. At the same time, the fusion community should recognize that the collaborative needs of the world's High Energy Physics (HEP) community are similar with the startup of the Large Hadron Collider (LHC) and the future International Linear Collider (ILC). There is sufficient overlap in the requirements between FES and HEP, that joint research into collaborative technologies will increase the benefit to both. While ITER operation is many years in the future, given the scope of its mission and the technical challenges that it presents, work towards the collaborative control room vision should begin now.

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