

A Remote Control Room at DIII-D*

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The current trend of worldwide experimental fusion science research is making remote participation increasingly critical. Although, the Internet has made remote monitoring of tokamak experiments relatively easy, fully engaging or taking on shift duties remotely for fusion experiments are still not reliable with the available tools and facilities. In order to create a persistent, efficient, and reliable remote participation environment at DIII-D, we are building an experimental remote control room in a 640-square-foot dedicated area. The purpose of building this room is to experiment and define a remote control room framework that can fulfill the remote collaboration needs of current and future fusion experiments such as ITER.

A variety of hardware equipment, such as H.323 video conferencing system, AccessGrid/VRVS-based collaboration system, webcams, and high-resolution shared tiled display walls have been installed in the remote control room. Research has been performed to use the same hardware effectively for multiple video conferencing techniques. Several software tools also have been deployed to accommodate the remote collaboration needs of users in this environment. Real-time plasma boundary and EFIT visualization program provides a visual representation of plasma shape, cryopump status, as well as magnetic coil status in quasi-realtime. The SharedAppVNC program accommodates cross-platform display sharing. The MultiCursor X window system lets multiple users, both local and remote, concurrently interact with shared tiled display system.

Although, the DIII-D remote control room is still a work in progress and new software tools are being implemented, it has been useful for a variety of international remote participation activities. For example, it has been instrumental during the initial startup of EAST Tokamak in China and proven effective for other joint experiments.

In this paper, we will describe the design of the remote control room as well as software tools implemented for remote collaboration needs. We will also present our recent experiences during the use of this room along with issues we faced.

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