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The design of remote discharge scenario management system on EAST

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HIGHLIGHTS

- The remote discharge scenario management system is established on EAST, it provides some useful function for operators to manage discharge scenarios and formulate discharge schedule.
- Operators can use this system to formulate discharge schedule on account of it can electing optimal scenarios automatically.
- The system is not only for local user but also for remote user.
- In the future, we can combine with actual discharge data and data mining technology to acquire optimal configuration, which to generate expert database and guiding experiment.

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ABSTRACT

The discharge scenarios on EAST plasma control system (PCS), characterized by different waveform parameters and different hardware requirements, will need a systematic discharge scenario management system for remote and local operators, in order to optimize storage structure and rationally manage discharge time. The remote management of discharge scenarios will require extending the functionalities of the present PCS "future shot" and "next shot" modules. Taking advantage of database technique, the operators can acquire detail information of all discharge scenarios directly without PCS user interface and search the specified scenarios by key words. In addition, the system can elect optimal scenarios automatically based on discharge schedule and plasma pulse setting for later artificial selection. To this purpose, a new remote discharge scenario management system (RDSMS) basis for Web is being conceived on EAST. The system contains a database with functions of "user management", "scenario verification", "prepared scenario management", "actual discharge scenario management" and "discharge schedule management". This paper will present the relevant conceptual design and give an account of the test results for implementation on EAST discharges.

1. Introduction

Coping with multiple discharge scenarios in an efficient way is an important issue in plasma operation, some previous design or application has being conceived on some tokmaks such as Tore Supra [1], ITER [2], ASDEX [3], JT-60 [4] for improved device operation. This paper reports conceptual design of EAST RDSMS.

After several years of development, EAST has become very complex device, containing a number of sophisticated sub-systems that demand complex operator programming for control during a discharge. Improper programming can lead to unwanted abnormalities or shot abort during a discharge. At present, EAST operators manage discharge scenarios using the plasma control system, which was adapted from DIII-D [5]. EAST PCS saves future shot parameters setting information in form of PCS setup files (which are named in suffix by .wa10) for use in discharge execution and archives the actual discharge shot parameters setting information in PCSSETUP nodes of MDSplus tree named pcs_east during the discharge [6], However, although EAST operators can call and retrieve these parameters through filename, user name or shot number (Fig. 1), there is no way to obtain more detail information on these parameters. An improvement in the retrieval functions is the object of this paper.

In order to manage discharge scenarios efficiently and conveniently, a remote discharge scenarios management system based on Web input is presented in this paper. The system takes advantage of database technology to implement the functions of scenario

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0920-3796/

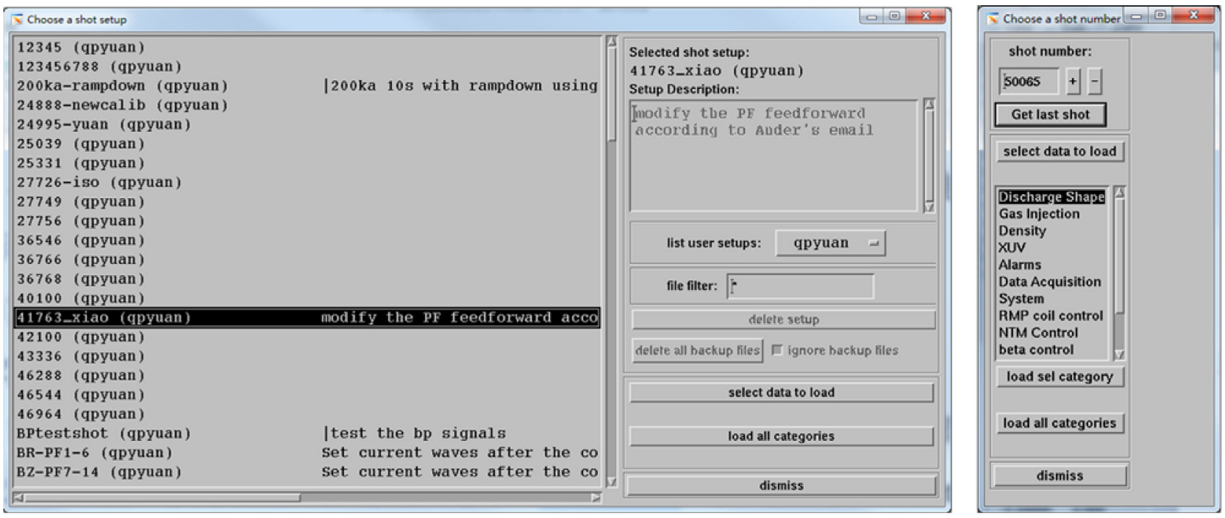

Fig. 1. Discharge scenario calling and retrieval in EAST PCS.

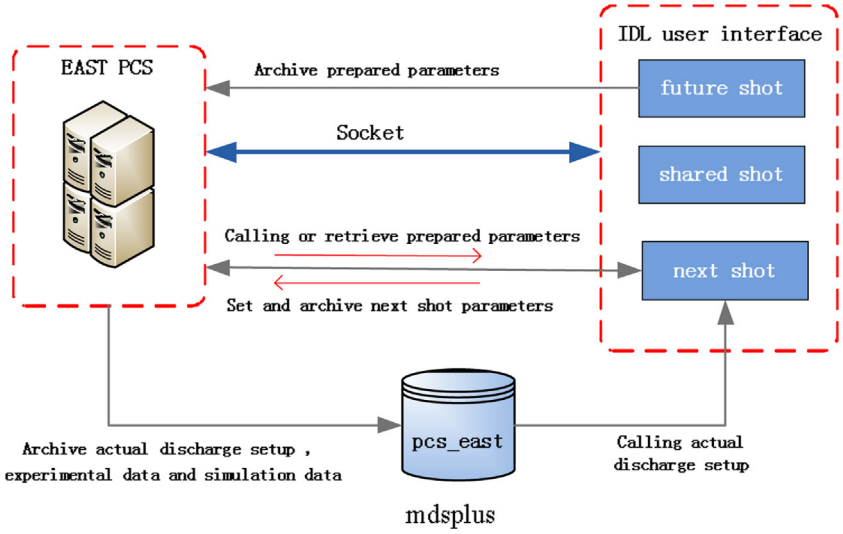

Fig. 2. The existing scenario management on EAST.

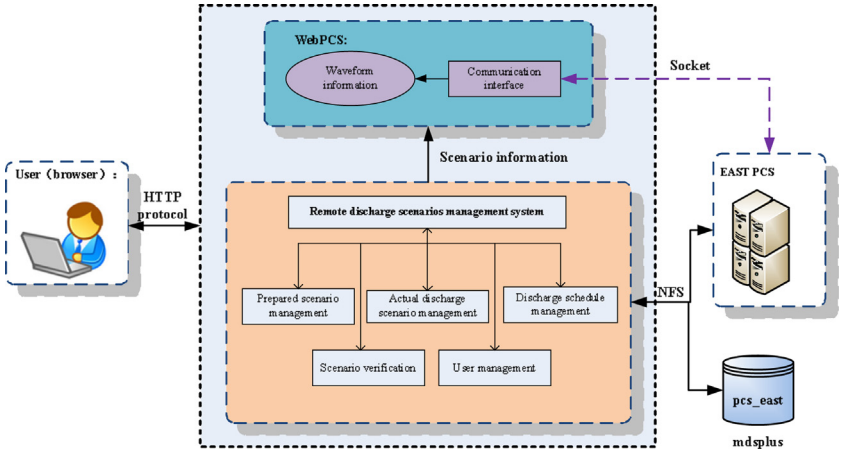

Fig. 3. System architecture of RDSMS.

verification, scenario classification, scenario query, scenario calling and actual discharge scenario. Furthermore, the operator can use this system to formulate a discharge schedule based on an automatically generated optimal scenario.

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