

DATA ANALYSIS SOFTWARE TOOLS FOR ENHANCED COLLABORATION AT THE DIII-D NATIONAL FUSION FACILITY*

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The DIII-D National Fusion Facility at General Atomics supports 300 researchers most from 54 collaborating institutions around the globe. Support for collaborating scientists therefore plays a key role in the development of data analysis software tools at DIII-D. The underlying philosophy of these development efforts is *uniformity*, both in terms of the look and feel of graphical user interfaces (GUI's) and in terms of access methods to analyzed datasets.

Uniform GUI's in data analysis tools are beneficial to both new collaborating scientists and existing members of the team. New users need to learn the interface only once, and get to apply their knowledge to every tool. Existing users do not need to switch gears every time they switch tools, so that they spend more time doing analysis with them instead of relearning them. Data analysis tools at DIII-D take advantage of an in-house developed object-oriented graphics library, GAPlotObj, to provide a uniform GUI for data manipulation. Written in IDL using IDL direct graphics, GAPlotObj allows programmers to encapsulate data display and manipulation methods, presenting the interface to the user in the same manner for every tool.

Uniform data access methods are beneficial to users for the same reasons: they need to learn only one interface to access many types of data. At DIII-D, the MDSplus system¹ is used as a repository for analyzed data, and as one interface to raw data acquired and stored in the PTDATA system.² The MDSplus system requires users to know only the location of their desired data in the hierarchical tree structure; they do not need to know the format in which the data is stored or even the physical location of the files.

Two examples of DIII-D data analysis tools using GAPlotObj and MDSplus will be presented. The first is ReviewPlus, a general purpose plotting tool than provides interactive 2D and 3D graphs of raw, analyzed and simulation data. The other example tool is EFITviewer, used to display results from the EFIT analysis code together with kinetic profiles and diagnostic and machine geometry overlays.

Extending concept of uniformity, both ReviewPlus and EFITviewer can be run at any fusion site using IDL to view data from any other site with an MDSplus interface to their data. Collaborating scientists are therefore able to use the same tool to analyze data from DIII-D and from their home institution, further reducing the amount of required learning and increasing efficiency. The issues involved in making these codes site-independent will also be discussed.

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¹J.A. Stillerman, *et al.*, Rev. Sci. Instrum. **68**(1):935, 1997.

²B.B. McHarg, Jr., Proc. IEEE Transactions on Nuclear Science **30**:3787, 1983.