DIII-D National Fusion Facility Guidance Document	**Title: Program Resources Provided to Users**	
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	Process Owner: DIII-D Deputy Director	
	DIII-D Director Approval: RJ Buttery	

REVISION HISTORY

Rev.	Date	Description
A	November 02, 2022	Initial release

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ACRONYMS

Acronym	Description
GA	General Atomics
MIT	Massachusetts Institute of Technology

GLOSSARY

Term	Description
Machine Hall	The enclosed region housing the DIII-D tokamak. This is the area inside of the radiation shielding walls that is off-limits during tokamak pulses.
User	An individual engaged in research activities within the DIII-D program.

1. PURPOSE AND SCOPE

This document clarifies the support items that are provided to DIII-D Users. This information is intended to inform User expectations such that they can make appropriate resource requests in Funding Opportunity Announcements and in other funding support they seek to obtain. Any services or resources that the DIII-D program provides through obligated funding to any and all Users to support their research projects should be listed. This information is intended to clarify the support that is presently provided by the facility. This guidance document should be reviewed by potential and current Users prior to initiating the Record of Discussion process.

It is noted that any DIII-D system, capability, or resource could be made available in support of User needs. A resource or service can be considered to be provided by the DIII-D program if it is available and can be obligated through existing budget authority. For the sake of clarity, only resources and services provided by GA, National Labs, and MIT are considered as options for resources that can be provided to Users by DIII-D.

For example, diagnostic cooling air is supported through the GA Operations portion of the DIII-D program budget and its scope is to serve all diagnostics. Therefore, if a new diagnostic is coming to DIII-D, then this cooling air can be considered to be provided by the DIII-D program. This means that the vast majority of resources and services can only be provided by GA. Some can be provided by the National Laboratories or MIT because their funding arrangements allow for such service-oriented engagement.

It is highly unlikely that resources or services provided by university or industry contractors can be considered as provided by DIII-D in the general sense. University funding is research specific, and contractor work is limited by the definition of the Statement of Work.

2. APPLICABLE REFERENCE DOCUMENTS

DIII-D Guidance Document 03: Developing New Research/Project Proposals
Details the Physics Validation Review process mentioned below.

3. RESOURCES PROVIDED TO USERS BY THE DIII-D PROGRAM

3.1. Within the Machine Hall (Pit)

Table 1 shows the status of resources primarily located within the Machine Hall (pit). These items are generally associated with space usage or hardware connections to the tokamak (including diagnostics).

Support Item Description	Provided Exclusively by DIII-D?	Notes
Physical Space	Yes	Allocations provided only through review processes
Cooling air or water	Yes	Must be integrated into facility systems
Base electrical power (standard outlet)	Yes	Only provided by facility, with locations for new outlets determined through review processes
Vacuum interface to tokamak	Yes	Allocations provided only through review processes
Radiation shielding	No	User designs according to their needs; design review processes determine components and installation procedures.
Gas injection to tokamak	Yes	Gas management system is maintained solely by facility, with access (including need for special/unique gases) enabled through project review processes. Deuterium gas is stocked for daily use, but Users must request other gases well in advance of need.
High Voltage	Yes	Allocations provided only through review processes
Craning	Yes	User may request training for authority to perform required craning activities
Radiation monitoring	Yes	Radiation Safety Officer directs all activities in this regard
Design reviews	Yes	Users prepare their own materials. Participation of facility personnel is provided as stated in Physics Validation Review and design review processes.
Drawings production - storage	Yes	Users may maintain their own repository for their projects, but facility copies are required as noted in design review and project management processes.
Surveying & metrology	No	Coordinated through facility staff. Users may be trained to use select equipment.
Path to areas outside of pit	Yes	Access through the shield walls of the Pit is managed solely by the facility and new feedthroughs are enabled through review processes
Network access	Yes	Review processes determine specifics of connection
Cable trays, support structures, stairs, platforms, and other non-electrical support equipment	No	Specific components must be approved through review processes, which extends to installation procedures.
Racks	No	
Gate valves	No	
Vacuum system components	No	
Remote controls (actuate in-pit equipment from external locations)	No	

Table 1: Status of Resources Within the Machine Hall

3.2. Outside the Machine Hall

Table 2 shows the status of physical resources primarily located outside of the Machine Hall (pit).

Support Item Description	Provided Exclusively by DIII-D?	Notes
Radiation shielding	No	User designs according to their needs; design review processes determine components and installation procedures
Leak checking	Yes	Users may be trained to qualify for their own leak checking (standalone systems), but primary vacuum is only checked by facility personnel
Cleaning components for vacuum	No	Users may perform select vacuum-preparation tasks with approval through design review processes
Safety training	Yes	All required safety training is provided through the facility. Users may work with the DIII-D Safety Officer to determine whether select trainings from their home institution can receive equivalent credit for facility training courses.
Shipping in/out	Yes	Users must use General Atomics shipping and receiving office to ensure materials are processed correctly
Quality Assurance inspections	Yes	Level of quality assurance inspection is determined through design review processes
On-site machining	Yes	Dependent upon application; external capabilities are generally available and assistance can be provided to Users in identifying appropriate vendor. User needs can also be served through facility capabilities, but only by qualified facility personnel.
Baking components	Yes	Users may be trained to be qualified operators of select facility resources
Fiber polishing	No	Users may be qualified to use facility equipment
Testing equipment (scopes, meters, etc.)	No	Users may bring their equipment for these purposes, and they also have access to select facility tools. Any Quality Assurance surveys must be performed by qualified facility personnel.
Calibration units (light sources, radiation sources, high-voltage systems, etc.)	No	Users may bring radiation sources following approval from the Radiation Safety Officer as part of review processes. Integrating spheres and associated spectral sources are available to Users with appropriate guidance. Other systems require approval through review processes.

Table 2: Status of Resources Outside the Machine Hall.

3.3. Data Systems

Table 3 shows the status of resources related to data systems.

Support Item Description	Provided Exclusively by DIII-D?	Notes
Digitization (up to 10 MHz)	No	Users may propose systems per their needs, though preference is given to standard models already in use. Facility can provide digitization hardware following review processes.
Digitization (beyond 10 MHz)	No	
MDSplus tree design	No	Users may design and propose MDSplus structures that are reviewed by the facility. Implementation and data management is provided exclusively by the facility.
MDSplus implementation	Yes	
MDSplus storage	Yes	
Cluster ZFS storage	Yes	Users provide input on organizational structure and identifiers through review processes
PTDATA storage	Yes	
Object (s3) storage	Yes	
Cluster Compute Capacity	Yes	
NERSC Allocation	No	
Network	Yes	
Email and Contacts System	Yes	Users are offered facility accounts. Ease of use and general participation is limited for those choosing to engage without facility accounts.
Videoconferencing	Yes	
SharePoint	Yes	
Discord	Yes	
Between shot or overnight analysis	Yes	Users design according to their needs, with facility implementation determined through design and review processes
Computer Aided Design (CAD) models	Yes	Existing CAD models for non-proprietary systems are accessible to Users. Storage and access to these data are overseen by the facility.
Plasma Control System (PCS)	Yes	Users may engage in PCS-related research with oversight from assigned facility personnel
Emergency small hardware replacement	No	As available, the facility will attempt to replace small components to ensure timely performance of research projects
Troubleshooting	Yes	Facility personnel with appropriate subject matter expertise assist Users with troubleshooting across software and hardware needs in according with resource allocations and facility priorities
Backup system for computers	No	Users may choose their own computer backup solutions, but access may be limited according to facility network security requirements. The facility provides access to a computer backup system for all Users (may not be compatible with the User's home institution policies). This extends to computers that are primarily used for facility research projects.
Virtual Private Network (VPN) access	Yes	Users are provided VPN access to the facility network
Anti-virus	Yes	Users are provided the option to use facility anti-virus solution for computers that are primarily used for facility projects

Table 3: Status of Resources Related to Data Systems.

3.4. Analysis

Table 4 shows the status of resources related to data analysis.

Support Item Description	Provided Exclusively by DIII-D?	Notes
Engineering analysis (disruption forces, thermal management, etc.)	No	Users are able to perform their own engineering analysis as part of system reviews. Facility personnel are available to lead these analyses through separately approved support agreements.
Finite Element Analysis (FEA) tools	No	There is no standard FEA tool preferred or provided by the facility
Instruction on how to use facility analysis tools	No	Users self-organize informational guides related to facility tools. The facility provides options to store this information in ways accessible to all Users.
Explicit personnel support for running analysis codes	No	Coordination of the research team may result in assignment of direct analysis support as determined by facility priorities. Users are separately able to organize into teams and groups for research projects.
Basic data provided for each plasma shot	Yes	As allowed by the parameters of the target plasma, the following data is provided by the facility with varying time and spatial resolution: - magnetic equilibrium - electron density (line-averaged and profile) - electron temperature - ion temperature - ion rotation velocities - impurity density
Installation of research analysis codes on facility compute servers	Yes	Users may suggest analysis codes for setup on the facility computer cluster(s). Such requests are assessed by the facility and supported as allowed by available resources and consistent with research priorities.
Toksys/PCSSP	Yes	Data analysis, controller design, model development, simulation, PCS testing
Commercial software (e.g., MatLab, Adobe Illustrator)	No	The program does not provide licenses for software. Users may request to have their own licenses installed on DIII-D computing clusters. The installation of User licenses will be performed as allowed by license terms.
DIII-D software libraries (DIII-D data access/manipulation functions)	Yes	These are various routines that find and extract data from storage systems.

Table 4: Status of Resources Related to Analysis Tasks.