



<b>DIII-D National Fusion Facility</b>  <b>Guidance Document</b>	<b>Title:</b> Research Program Planning	
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## Table of Contents

**ACRONYMS**..... 2

**GLOSSARY** ..... 2

1. *PURPOSE AND SCOPE* ..... 2

2. *APPLICABLE REFERENCE DOCUMENTS*..... 2

3. *ROLES AND RESPONSIBILITIES* ..... 2

4. *RESEARCH PROGRAM PLANNING*..... 3

4.1. *Long-range Strategic Planning*..... 3

4.2. *Five-Year Research Plan*..... 3

4.3. *Strategic Workshops*..... 3

4.4. *Annual Experiment Plan*..... 4

4.5. *Monthly and Daily Experimental Planning* ..... 5

### ACRONYMS

Acronym	Description
DOE	U.S. Department of Energy
FES	Fusion Energy Sciences
GA	General Atomics
PAC	Program Advisory Committee
SC	Office of Science
UB	User Board

### GLOSSARY

Term	Description
Coordinating Body	A group within the DIII-D program that is defined within the Governance Charter.
Team Member	Any person who contributes to any aspects of the DIII-D program.
User Board	A coordinating body that serves to provide independent oversight of the research program. The characteristics of this group, including responsibilities, are detailed in the Governance Charter.
Users	Personnel who directly engage in the Experimental Science program through participation in recognized projects (i.e., projects that are submitted for the annual DOE SC User Report.) All users are also team members.

## 1. PURPOSE AND SCOPE

The purpose of this document is to outline the series of planning events, associated roles and responsibilities, feedback collection, and decision-making processes that govern the planning of the DIII-D Experimental Science program.

## 2. APPLICABLE REFERENCE DOCUMENTS

- Governance Charter: document that defines the roles and responsibilities of coordinating bodies within the DIII-D program.

## 3. ROLES AND RESPONSIBILITIES

- Fusion Energy Sciences: provides high-level goals and requirements that inform the processes detailed within this Guidance Document.
- DIII-D Director: assesses inputs received from the process detailed below and makes final determinations on resource allocation to serve identified priorities and goals.
- Experimental Science Director: oversees the program planning elements contained within this Guidance Document.
- DIII-D Run Coordinator Team: a group of Users (typically 5) who oversee the scheduling of experiments.
- Operations Director: ensures that timely information concerning facility capabilities are provided to other managing entities.
- Users: serve in leadership and management roles within the Experimental Science program. Through participation in the planning elements detailed below, users provide feedback that influences the determination of program projects and priorities.
- Physics Group: a defined organizational element within the Experimental Science program. These may be referenced as Topical Areas, Thrusts, or any other specific designation.

## 4. RESEARCH PROGRAM PLANNING

Planning within the DIII-D program is performed in collaboration with DIII-D management, Users, and DOE FES. The broader fusion energy research community exercises multiple options to provide input and feedback in these planning efforts. The full range of research activities is subject to planning processes, from the daily experimental schedule to long-term strategic planning. GA and all DOE-funded Users and team members provide regular reporting to DOE.

Beginning with the longest timescale, the planning processes for the program are detailed below.

### 4.1. Long-range Strategic Planning

As conditions merit, a **Long-range Strategic Planning** exercise will be performed (typically prior to the preparation of a Five-Year Research Plan as described below). This process is as follows:

- Experimental Science Director oversees the communication of goals and any boundary conditions (e.g., targeted years of the planning exercise) to the DIII-D team.
- Hold a workshop in which team members are able to propose and expand their individual ideas on high-level priorities.
- Subject matter expert analysis groups provide technical detail and backing for concepts that are identified as high priority from the workshop.
- The Program Advisory Committee (PAC, a coordinating body) is charged with reviewing the coherent plan that emerges from the analysis groups and program leadership input, and provides key advice on direction and adjustment of the plan.
- Feedback from the PAC is incorporated into revised proposals and plans that may then be incorporated into assorted proposals for funding support.

### 4.2. Five-Year Research Plan

A **Five-Year Research Plan** is prepared every five years coinciding with the renewal period for the GA Cooperative Agreement that provides for primary oversight of the DIII-D facility.

- The process begins with a Long Range Planning Workshop (described in Section 4.1).
- A draft Five-Year Research Plan is prepared by the DIII-D team. Multi-institutional teams are formed to develop various possible program elements for inclusion in the Five-Year Research Plan.
- The draft plan is presented to the PAC for their consideration. Feedback generally leads to refinements in the proposed plan.
- GA submits the proposed Five-Year Research Plan to DOE FES. In parallel, other grant-holding User institutions and National Laboratories develop their own detailed plan to complement the overall DIII-D Five-Year Research Plan. Companion documents from these institutions are submitted alongside the GA proposal to provide a complete view of the DIII-D program to the FES program management.
- A formal GA proposal for a Cooperative Agreement, with content based on the Five-Year Research Plan, is reviewed by FES.
- Once in place, the Cooperative Agreement between GA and the DOE allows for the Five-Year Research Plan to be updated as needed to maintain consistency with the evolution of national program priorities and technical developments in the international fusion effort.

### 4.3. Strategic Workshops

**Strategic workshops** are held at least once every two years to identify near term priorities.

- This combines Physics Group and program wide activities to consult the team on high priority initiatives for the next 1 - 2 years in a series of workshop events.
- Physics Group leaders, in concert with the Experimental Science Director, identify high priority topical proposals for the program.
- High-level research goals covering the next 1 - 2 years are put forward for consideration by the DIII-D Research Council and the full research team.
- Following the initial discussion of possible research goals, the DIII-D Director provides initial guidance for allocating 80% of experimental time among the research topics. This guidance will include some amount of time for high priority research topics (thrusts), if any are identified. Special Task Forces may be created to address a particular topic. The remaining 20% of the run time is reserved for allocation in mid-year following an evaluation of progress on achieving research goals. This allocation is determined by the DIII-D Director in consultation with the Experimental Science Director and the UB.
- Input is also sought from collaborating research facilities, including those outside of the FES portfolio, and FES guidance is taken into account.
- Input is assimilated and drafted into a Run Time Guidance note, reviewed with the UB and FES prior to release within the DIII-D program.

#### 4.4. Annual Experiment Plan

An **Annual Experiment Plan** is formulated following the completion of the strategic workshop described in Section 4.3, or, in years without a strategic workshop, near the end of the first-year campaign in that two-year cycle. This process includes:

- A review of the previous year's results is presented in a DIII-D Year-End Review. This review may be provided through other forums, such as the annual American Physical Society, Division of Plasma Physics (APS-DPP) meeting or the International Atomic Energy Agency (IAEA) Fusion Energy Conference (FEC). This review provides the technical basis to begin developing the experimental plan for next fiscal year's operation.
- An international Research Opportunities Forum is held, providing an opportunity for the global fusion research community to propose experiments within the thrust and topical areas. The ROF also provides an opportunity for open discussion of the proposed ideas. Methods for remote interactive participation are provided.
- The Experimental Science Director oversees the preparation of a document describing the plan.
- Additional review of the plan is performed by the UB and DIII-D Director. It may be included within the charge of the PAC, but it is not required to be part of the charge. Upon approval by the DIII-D Director, the plan may be executed.
- The annual Experimental Plan is reviewed on a monthly basis, taking into account changing hardware availability and DIII-D or national program priorities, as provided by FES.

#### 4.5. Monthly and Daily Experimental Planning

**Monthly and Daily Experimental Planning** is managed by the DIII-D Run Coordinator team. The Run Coordinator team performs this work in consultation with the directors of DIII-D Operations, Experimental Science, area leaders, and other team members. This coordination is important to ensure that high priority research lines are given the operating time necessary to reach impactful outcomes. Run coordinators do not make priority choices between different experiments, but merely seek to arrange the program for execution with optimal efficiency given the experimental requirements and availability of facility capabilities. This team also ensures needed resources are broadly communicated.