

The only official copy of this document is the one online in the SharePoint Document Center. Before using a printed copy, verify that it is current by checking the printed document's Revision History log with that of the online version.

Electron-Ion Collider, Brookhaven National Laboratory and Thomas Jefferson National Accelerator Facility			
Doc No. EIC-SEG-PLN-001	Author: Meaghan Allard	Effective Date: December 5, 2024	Review Frequency: 5 years
Plan: EIC Systems Engineering Data Management Plan			Revision: 00

Electron-Ion Collider Plan

EIC Systems Engineering Data Management Plan

December 5, 2024

Prepared By:

Signed by:

C0342222BDD489...

Date: 12/5/2024

Meaghan Allard, Systems Engineer
EIC at TJNAF

Reviewed By:


Signed by:

5B6EC8D868EF491...

Date: 12/5/2024

Walt Akers, Division Technical Interface
EIC at TJNAF

Approved By:

DocuSigned by:

D44A201A4A52426...

Date: 12/5/2024

Thomas Russo, Chief Systems Engineer
EIC at BNL

The only official copy of this document is the one online in the SharePoint Document Center. Before using a printed copy, verify that it is current by checking the printed document's Revision History log with that of the online version.

Electron-Ion Collider, Brookhaven National Laboratory and Thomas Jefferson National Accelerator Facility			
Doc No. EIC-SEG-PLN-001	Author: Meaghan Allard	Effective Date: December 5, 2024	Review Frequency: 5 years
Plan: EIC Systems Engineering Data Management Plan			Revision: 00

This page intentionally left blank, to accommodate back-to-back printing.

The only official copy of this document is the one online in the SharePoint Document Center. Before using a printed copy, verify that it is current by checking the printed document's Revision History log with that of the online version.

Electron-Ion Collider, Brookhaven National Laboratory and Thomas Jefferson National Accelerator Facility			
Doc No. EIC-SEG-PLN-001	Author: Meaghan Allard	Effective Date: December 5, 2024	Review Frequency: 5 years
Plan: EIC Systems Engineering Data Management Plan			Revision: 00

REVISION HISTORY

Revision #	Effective Date	List of Reviewers	Summary of Change
00	12/5/2024		Initial release.

The only official copy of this document is the one online in the SharePoint Document Center. Before using a printed copy, verify that it is current by checking the printed document’s Revision History log with that of the online version.

Electron-Ion Collider, Brookhaven National Laboratory and Thomas Jefferson National Accelerator Facility			
Doc No. EIC-SEG-PLN-001	Author: Meaghan Allard	Effective Date: December 5, 2024	Review Frequency: 5 years
Plan: EIC Systems Engineering Data Management Plan			Revision: 00

TABLE OF CONTENTS

1.	SCOPE	6
2.	OVERVIEW	6
3.	TYPES OF DATA, DOCUMENTS, AND STORAGE DESCRIPTIONS	6
3.1.	PLANNING DOCUMENTS	7
3.2.	REQUIREMENTS DOCUMENTS	7
3.3.	INTERFACE DOCUMENTS	7
3.4.	ADDITIONAL DATA	8
4.	DATA MANAGEMENT PROCESS	8
4.1.	GENERAL DEVELOPMENT AND APPROVAL PROCESS	9
4.2.	IN-PROCESS DOCUMENT VERSION CONTROL.....	9
4.3.	OTHER DATA.....	10
5.	DOCUMENT REVISIONING	10
5.1.	APPROVED DOCUMENT REVISIONING.....	10
5.2.	IN-PROCESS DATA REVISIONING	10
5.3.	DATA WITHOUT VERSION CONTROLL (DOCUMENT INDEX)	10
6.	APPROVALS AND SIGNATURES.....	11
7.	ACCESS AND SHARING	11
8.	ARCHIVING AND DATA RETENTION	11
9.	REFERENCES	11

The only official copy of this document is the one online in the SharePoint Document Center. Before using a printed copy, verify that it is current by checking the printed document's Revision History log with that of the online version.

Electron-Ion Collider, Brookhaven National Laboratory and Thomas Jefferson National Accelerator Facility			
Doc No. EIC-SEG-PLN-001	Author: Meaghan Allard	Effective Date: December 5, 2024	Review Frequency: 5 years
Plan: EIC Systems Engineering Data Management Plan			Revision: 00

LIST OF ACRONYMS

BNL	Brookhaven National Laboratory
EIC	Electron-Ion Collider
FRD	Functional Requirements Document
GLRD	Global Requirements Document
GRD	General Requirements Document
ICD	Interface Configuration Document
IMP	Interface Management Plan
IRD	Interface Requirements Document
JLab	Thomas Jefferson National Accelerator Facility
MICD	Master Interface Configuration Document
PRD	Performance Requirements Document
RMP	Requirements Management Plan
SEG	Systems Engineering Group
SEMP	Systems Engineering Management Plan

The only official copy of this document is the one online in the SharePoint Document Center. Before using a printed copy, verify that it is current by checking the printed document’s Revision History log with that of the online version.

Electron-Ion Collider, Brookhaven National Laboratory and Thomas Jefferson National Accelerator Facility			
Doc No. EIC-SEG-PLN-001	Author: Meaghan Allard	Effective Date: December 5, 2024	Review Frequency: 5 years
Plan: EIC Systems Engineering Data Management Plan			Revision: 00

Electron-Ion Collider Engineering Data Management Plan

1. SCOPE

The Systems Engineering Group (SEG) is responsible for ensuring data related to requirements, interfaces, and system design are version controlled, managed, and coordinated throughout the lifetime of the Electron-Ion Collider (EIC). The EIC project is a collaborative effort between Brookhaven National Laboratory (BNL) and Thomas Jefferson National Laboratory (JLab). This plan addresses the SEG approach for consistent data management.

2. OVERVIEW

The SEG follows the EIC project approval process for all documents, including SEG planning documents. The SEG also works closely with Technical Owners, who are responsible for the design, to develop requirements, interfaces, and other requirement related data. To handle the various data sources, the SEG data management process:

- 1) ensures the timely collection of complete, correct, and consistent requirements from the Technical Owners,
- 2) manages this information to ensure compliance with version-control, change management and project approval requirements,
- 3) provides mechanisms to make this data available and accessible to those who need it, and
- 4) verifies all permanent documents are archived in the BNL Document and Records Center

The SEG employs a number of approaches depending on the type of data and the data source. Requirements and interface information obtained from Technical Owners is stored in Visure, a commercial requirements management software package. This software records all changes and modifications that happen to the data over time. The requirements recorded in Visure are then published to an external website, the [EIC Systems Engineering Data Portal](#) (web portal), for ease of access by staff and users. The requirements entered into this system are reviewed by members of the systems engineering team during input and collected to undergo the approval process before formal reviews.

During the development cycle, there are situations where in-process documents are circulated to the larger community for review and adaptation prior to formal approval. These documents are also subject to version control and are typically accessible through the EIC Systems Engineering Data Portal. Upon finalization and approval, these transitive documents are placed in the project document repository.

3. TYPES OF DATA, DOCUMENTS, AND STORAGE DESCRIPTIONS

The SEG is responsible for generating and managing the documents specified in the following subsections. Documents requiring signatures are stored in the Document and Records Center. Requirements managed

The only official copy of this document is the one online in the SharePoint Document Center. Before using a printed copy, verify that it is current by checking the printed document’s Revision History log with that of the online version.

Electron-Ion Collider, Brookhaven National Laboratory and Thomas Jefferson National Accelerator Facility			
Doc No. EIC-SEG-PLN-001	Author: Meaghan Allard	Effective Date: December 5, 2024	Review Frequency: 5 years
Plan: EIC Systems Engineering Data Management Plan			Revision: 00

in Visure are published to the web portal. These requirements are also organized into a document at specific milestones to obtain signatures and to be stored in the Document and Records Center. Supporting documents that are maintained locally and contribute to requirements definition (and exist outside of Visure), receive approvals through the Documents and Records Center and are made available through the web portal. Finally, some supporting documents are maintained by user institutions and contributors. These documents remain in the control of the external institutions but are referenced on the web portal.

The following subsections identify documents generated from the Systems Engineering Management Plan (SEMP) but may be expanded as necessary. The subsections also include the SEG approved primary access location for requirements and documents. Contact Systems Engineering with any questions.

3.1. PLANNING DOCUMENTS

Systems engineering planning documents contain requirement definitions and hierarchy. The reviewed and approved documents are maintained in the BNL Document and Records Center.

Document Name	Primary Access Location	Version Control
Systems Engineering Management Plan (SEMP)	BNL Document & Records Center	Yes
Requirements Management Plan (RMP)	BNL Document & Records Center	Yes
Interface Management Plan (IMP)	BNL Document & Records Center	Yes

3.2. REQUIREMENTS DOCUMENTS

Most requirements are managed in Visure, with the exception of dynamically computed requirements such as the Infrastructure Utility Requirements. Requirements in Visure are organized into the respective requirements documents as specified in the SEMP for record keeping by the Document and Records Center. Dynamically computed requirements are published to the BNL Document and Records Center.

Document Name	Primary Access Location	Version Control
Global Requirements Document (GLRD)	Visure	Yes
General Requirements Documents (GRD)	Visure	Yes
Functional Requirements Documents (FRD)	Visure	Yes
Performance Requirements Documents (PRD)	Visure	Yes
Infrastructure Utility Requirements	BNL Document & Records Center	Yes

3.3. INTERFACE DOCUMENTS

The interface requirements are managed in Visure and are used to derive the respective documents as specified in the SEMP and the Interface Management Plan.

The only official copy of this document is the one online in the SharePoint Document Center. Before using a printed copy, verify that it is current by checking the printed document’s Revision History log with that of the online version.

Electron-Ion Collider, Brookhaven National Laboratory and Thomas Jefferson National Accelerator Facility			
Doc No. EIC-SEG-PLN-001	Author: Meaghan Allard	Effective Date: December 5, 2024	Review Frequency: 5 years
Plan: EIC Systems Engineering Data Management Plan			Revision: 00

Document Name	Primary Access Location	Version Control
Interface Requirements Documents (IRD)	Visure	Yes
Interface Configuration Documents (ICD)	BNL Document & Records Center	Yes
Interface Definition Documents (IDD)	BNL Document & Records Center	Yes
Master Interface Configuration Documents (MICD)	BNL Document & Records Center	Yes

3.4. ADDITIONAL DATA

Data and documentation provided by internal Technical Owners and external partners are evaluated by the SEG to determine the appropriate level of document control. All data contributing to requirement definition **must be** version controlled and follow the processes described in the following section.

4. DATA MANAGEMENT PROCESS

The SEG develops policy and guidance documents related to the systems engineering process, such as the SEMP. In addition, the SEG assists Technical Owners to write requirements, interfaces, and technical data tables. These documents follow the same approval process and are archived in the Document and Records Center at the Preliminary Design Review (PDR), Final Design Review (FDR), Project Readiness Review (PRR), and other major milestones in accordance with the EIC Technical Maturity Plan.

To ensure data integrity, information managed in Visure is only directly accessible by members of the SEG. These requirements and select dynamically computed references are publicized for all EIC internal and external users during the Organize Data stage prior to formal approval per Figure 1. This information is version controlled before it is made available on the web portal. Data that is in the organization stage and version controlled, is considered “in-process” because the data has not been formally approved. The data may be revised as many times as necessary before proceeding to the formal approval stage.

Data from external contributors and partners maybe linked to on the web portal but are not version controlled by SEG. Contact the SEG for assistance determining the appropriate version control process.

The only official copy of this document is the one online in the SharePoint Document Center. Before using a printed copy, verify that it is current by checking the printed document’s Revision History log with that of the online version.

Electron-Ion Collider, Brookhaven National Laboratory and Thomas Jefferson National Accelerator Facility			
Doc No. EIC-SEG-PLN-001	Author: Meaghan Allard	Effective Date: December 5, 2024	Review Frequency: 5 years
Plan: EIC Systems Engineering Data Management Plan			Revision: 00

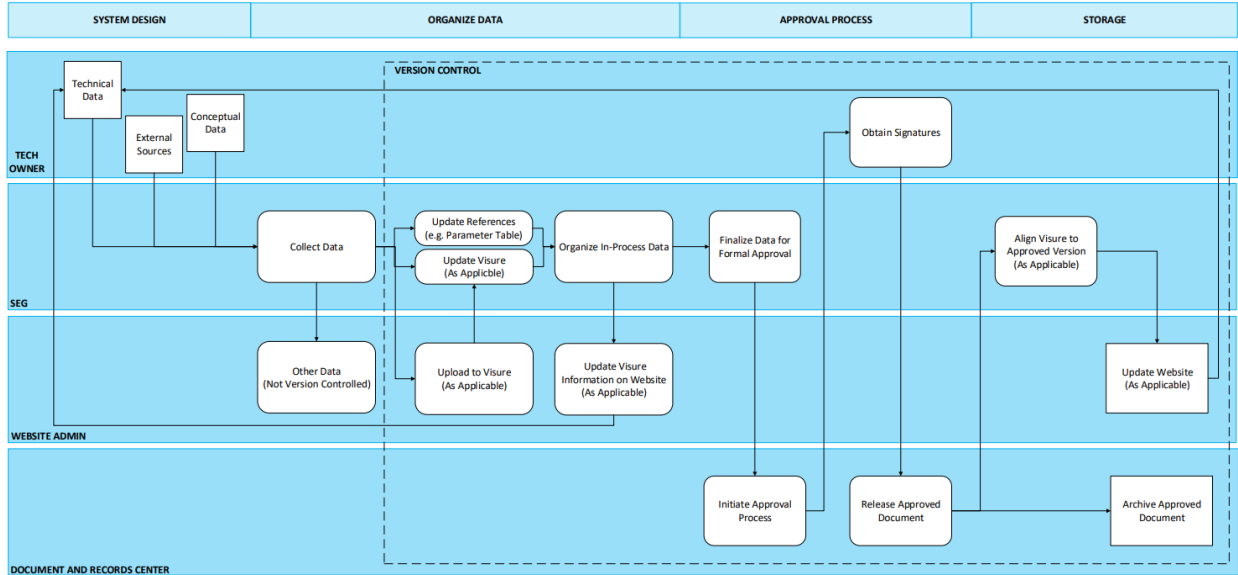


Figure 1 SEG Data Management Process

4.1. GENERAL DEVELOPMENT AND APPROVAL PROCESS

The Technical Owners develop the technical parameters and use them to create formal requirements and interfaces with the assistance of the SEG. The requirements are either entered directly into Visure or may be organized into a data entry table. The Systems Engineer obtains a document number from the Document and Records Center per the Management of EIC Documents and Records Process. When the Technical Owner and System Engineer finalize the document, it is forwarded to the BNL Document and Records Center to be formatted and sent out for signatures. The Technical Owner is responsible for obtaining all approvals prior to a review or baseline. After approval, the document is archived in the Document and Records Center for future reference. If the requirements are managed in Visure, the Systems Engineer will update the Visure database to be consistent with the approved document. Upon completion, the Systems Engineer also notifies the website administrator that the approved information can be published to the web portal.

When revising an approved document, the Systems Engineer first acquires the latest original source (Word, Excel, etc.) from the Document and Records Center. Once changes have been incorporated, the document is sent back through the approval process described in Figure 1.

4.2. IN-PROCESS DOCUMENT VERSION CONTROL

The Technical Owners work closely with the Systems Engineer(s) to develop requirements and other resources that need to be version controlled. The Systems Engineer determines if the organized data needs to be uploaded to Visure, updated in Visure, or version controlled by the web portal administrator. The

The only official copy of this document is the one online in the SharePoint Document Center. Before using a printed copy, verify that it is current by checking the printed document’s Revision History log with that of the online version.

Electron-Ion Collider, Brookhaven National Laboratory and Thomas Jefferson National Accelerator Facility			
Doc No. EIC-SEG-PLN-001	Author: Meaghan Allard	Effective Date: December 5, 2024	Review Frequency: 5 years
Plan: EIC Systems Engineering Data Management Plan			Revision: 00

administrator uploads the updated requirement(s), which all have a unique identifier, with the modification date. Other resource documents sent to the administrator are archived and posted under the document’s unique identifier. The web portal is updated when the SEG notifies the web administrator that revised data is available. When the requirements or resources need formal approval, the data is structured into a document with a signature cover page before being routed for approval per Figure 1. The requirements are marked approved and updated to the web portal once the document completes the approval process.

4.3. OTHER DATA

The web portal administrator also incorporates links to documents produced by external project partners into a document index. This information is collected by the Systems Engineer and passed to the web administrator but is not archived or version controlled.

5. DOCUMENT REVISIONING

5.1. APPROVED DOCUMENT REVISIONING

When a document revision is warranted, the revision control process requires the Systems Engineer to collect information, organize it into a standard format, and route it for approval as shown in Figure 1. After documents are approved for PDR, they are version controlled and must include a summary of changes in the subsequent revisions. At a minimum, changes to requirements, interfaces, and other supporting documents must undergo the approval process at the Preliminary Design Review (PDR), Final Design Review (FDR), Project Readiness Review (PRR), and other major milestones in accordance with the EIC Technical Maturity Plan. Document numbers and revisions are maintained by the BNL Document and Records Center in accordance with the Management of EIC Documents and Records Process Plan.

SEG documents produced in support of requirement definition are identified by the document number assigned by the Document and Records Center when it is processed for approval. This document number and the revision date are provided whenever the document is posted to the web portal or other location.

5.2. IN-PROCESS DATA REVISIONING

In-process version control primarily applies to requirements managed in Visure. Each requirement has a SEG assigned unique identifier based on the sub-system dictionary. Requirements managed in Visure are made available on the web portal along with their status and last date they were updated. This allows users to determine if changes were made since the data was last approved through the Document and Records Center.

5.3. DATA WITHOUT VERSION CONTROL (DOCUMENT INDEX)

Other data and information provided by external contributors and linked on the web portal are not version controlled or subject to revisioning by SEG.

The only official copy of this document is the one online in the SharePoint Document Center. Before using a printed copy, verify that it is current by checking the printed document’s Revision History log with that of the online version.

Electron-Ion Collider, Brookhaven National Laboratory and Thomas Jefferson National Accelerator Facility			
Doc No. EIC-SEG-PLN-001	Author: Meaghan Allard	Effective Date: December 5, 2024	Review Frequency: 5 years
Plan: EIC Systems Engineering Data Management Plan			Revision: 00

6. APPROVALS AND SIGNATURES

The documents and supporting data references are signed by the Technical Owners and stakeholders determined by the EIC project organizational chart. The Technical Owners are responsible for the content of the documents and ensuring all signatures are obtained prior to reviews include, but are not limited to PDR, FDR, PRR, and baseline(s).

7. ACCESS AND SHARING

The BNL Document and Records Center is a read-only document library accessible to all EIC project members. Access to Visure is restricted to the SEG. Therefore, the requirements are published to the EIC Systems Engineering Portal, which can be accessed by any EIC project member and external contributor ([EIC Systems Engineering Data Portal](#)).

8. ARCHIVING AND DATA RETENTION

The BNL Document and Records Center maintains an archive of formally approved documents and retains a copy the original document in the word or excel format in accordance with the Management of EIC Documents and Records.

9. REFERENCES

- 9.1. EIC-SEG-PLN-022, *Systems Engineering Management Plan*
- 9.2. EIC-SEG-PLN-016, *Requirements Management Plan*
- 9.3. EIC-SEG-PLN-017, *Requirements Management Plan for Detector Systems*
- 9.4. EIC-SEG-PLN-020, *EIC Interface Management Plan*
- 9.5. EIC-SEG-PDN-010, *EIC Technical Design Maturity Plan*
- 9.6. EIC-ISG-PDN-001, *Management of EIC Documents and Records*
- 9.7. EIC-SEG-PLN-020, *EIC Interface Management Plan*
- 9.8. EIC-ORG-PLN-025, *Configuration Management Plan*