Business Architecture Committee (NBAC)

Registry Repository Tiger Team

(R2TT)

NIEM IEPD Registry/Repository System Requirements Specification

NIEM IEPD Registry/Repository System Requirements Specification

EXECUTIVE SUMMARY

The National Information Exchange Model (NIEM) community has been active for over 15 years. Its genesis was born out of the Global War on Terrorism was the realization that Interagency, particularly those involved with law enforcement, intelligence, emergency management as well as customs and border protection, immigration, and the US Coast Guard needed to be able to share information more thoroughly, quickly and efficiently. Hence, NIEM became part of the restructuring which included the consolidation of agencies under the Department of Homeland Security (DHS), the creation of an Office of the Director of National Intelligence (ODNI)/Director of National Intelligence (DNI) as well as other recommendations of the 911 Commission. However, NIEM's charter to exchange information is responsive to more than just Federal equities and includes state local and tribal partners. Department of Defense Chief Information Officer (DoDCIO) Memorandum, dated April 3, 2019, declared the transition of NIEM primary sponsorship responsibilities from the DHS to the Department of Defense (DoD) effective January 1, 2019.

NIEM is currently represented by fifteen domains including: Agriculture, Biometrics, Cyber, Emergency Management, Immigration, Human Services, MilOps, Justice, Maritime, Surface Transportation, Chemical Biological Radiological and Nuclear, Intelligence, International Trade, Infrastructure Protection and Screening. Along with the transition of primary sponsorship of NIEM to DoD in 2019, NIEM has seen an increased interest by potential new adopters to consider NIEM as their information exchange protocol/standard with Cyber Domain being the newest arrival in December 2019. The growth prospect for 2020 is even more aggressive with the potential of on-boarding domains in the areas of Statistics, Health, Meteorology & Oceanography (METOC), Logistics, and Humanitarian Aid. Recognizing this growth and a renewed interest in NIEM, the NIEM leadership under the auspices of the Executive Steering Council has recognized the need to make the mechanics of adopting NIEM and creating NIEM information exchanges more user friendly to potential clients. A significant way to encourage the adoption of NIEM is to facilitate developers to upload IEPDs to enable enterprise discovery, download, and re-use. This potential to re-use existing Information Exchange Package Documentation (IEPD) enables new adopters by lowering the threshold for creating new IEPDs tailored to their needs.

During the NIEM Business Architecture Committee (NBAC) - NIEM Technical Architecture Committee (NTAC) Face-to-Face Meeting in October 2019, leadership tasked the NIEM Management Office (NMO) to establish a tiger team to explore and define requirements for development of potential NIEM IEPD registries and repositories. The Registry/Repository Tiger Team (R2TT) was established in November of 2019. Its membership was drawn from the NBAC, NTAC and NMO. This System Requirement Specification (SRS) documents the tiger team's consensus on concepts and requirements for three registry/repository alternatives: a NIEM Public Registry (Section 2), a NIEM Restricted Repository (Section 3), and a NIEM Public Repository (Section 4). The SRS was also vetted by the broader NBAC/NTAC community before final publication. Each of these concepts leverages from the others. The NIEM Public Registry focuses on a near term, low overhead product leveraging existing DHS equities for people to register IEPDs to enable discovery and IEPD re-use. The NIEM Restricted Repository focuses on a web-service/web presence for people to upload IEPDs to enable discovery, download, and re-use, but acknowledges the need to manage and control access to IEPD resources maintained and stored in the repository. The NIEM Public Repository leverages the functionality of the NIEM Public Registry, but includes the capability to store, upload, and download IEPDs from within the repository system.

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1. Overview

A recurring theme expressed by the National Information Exchange Model (NIEM) Community is the need for a Public NIEM Registry, whereby interested parties can search, discover, and then locate Information Exchange Package Documentation (IEPD)s for investigation and possible re-use. Additionally, once an IEPD has been located and retained, tools need to be available to enable efficient inspection and re-use of artifacts particularly subset and extension schema. Over the history of NIEM, several attempts to develop registries and repositories have been explored and implemented, but with limited success and sustainability. Likewise, the turnover of leadership and governance within some domains have exacerbated the issue of identifying and locating IEPDs.

For our purpose, **a registry is defined** as a place, such as a web-service/web-presence for people to register IEPDs to enable discovery and IEPD re-use; and, **a repository is defined** as a place, such as a web-service/web presence for people to upload IEPDs to enable discovery, download, and re-use.

Remnants of formerly active registries exist on github.io, and the National Information Sharing Standards (NISS) Information Exchange Package Documentation (IEPD) and Justice Standards Clearinghouse is still functioning, https://it.ojp.gov/implementation/niem-iepd, albeit, some of the content appears stale. The NIEM Management Office (NMO) is in discussions with Department of Justice (DOJ) to explore the possibility of continuing and updating the Clearinghouse repository.

Throughout 2019, NIEM leadership consistently showed interest in exploring the feasibility of instantiating a NIEM Public Registry with the objective of encouraging new NIEM adopters by providing a venue for IEPD discovery and re-use. During the Annual NIEM Business Architecture Committee - NIEM Technical Architecture Committee (NBAC-NTAC) Face-to-Face (F2F) meeting this October 2019, a demonstration of a prototype registry based on a Department of Homeland Security (DHS) Drupal implementation prompted discussion on the benefits of a NIEM Public Registry. F2F leadership decided to stand up a Registry/Repository Tiger Team (R2TT) to scope alternative concepts, define requirements, determine the level of effort and resources needed for implementation, and recommend a stand-up strategy for a near term NIEM Public Registry solution. This System Requirement Specification (SRS) documents the findings of the R2TT and its recommendation for registry and repository requirements. It does not analyze the costs associated with any approach with the exception that the NIEM Public Registry assumes only sunk costs.

It is recognized that the Military Operations (MilOps) Domain and potentially other NIEM domains, such as CYBER, may need a restricted registry/repository alternative. Such a system would require identity management, authentication and access controls, rules governing assignment of roles and privileges for enterprise search and discovery, IEPD registration, IEPD uploads and downloads beyond those requirements envisioned for a public registry or repository.

Established by Executive Order 13556, the Controlled Unclassified Information (CUI) program standardizes the way the Executive branch handles unclassified information that requires safeguarding or dissemination controls pursuant to and consistent with law, regulations, and Government-wide policies. The CUI Executive Agent, National Archives. Issues guidance to Executive branch departments and agencies that handle unclassified information that requires safeguarding or dissemination controls, pursuant to and consistent with applicable law, regulations, and government-wide policies. Guidance issued by the CUI Executive Assistant (EA) is not binding on the public, unless authorized by law or when incorporated into contracts or agreements. Policy and guidance derives from Executive Order 13556 and 32 CFR Part 2002. [1,2]

The National Institute of Standards and Technology (NIST) publications have been incorporated by reference into the CUI Implementing Directive, 32 CFR Part 2002, and provide guidance on implementing specific measures to safeguard CUI: [3-8]

- Federal Information Processing Standards Publication 199, Standards for Security Categorization of Federal Information and Information Systems
- Federal Information Processing Standards Publication 200, Minimum Security Requirements for Federal Information and Information Systems
- NIST Special Publication 800-53, Revision 4, Security and Privacy Controls for Federal Information Systems and Organizations

- NIST Special Publication 800-88, Revision 1, Guidelines for Media Sanitization
- NIST Special Publication 800-171, Revision 1, Protecting Controlled Unclassified Information in Non-federal Systems and Organizations
- NIST Special Publication 800-171A, Assessing Security Requirements for Controlled Unclassified Information

In the MilOps case, DoDI 5230.24 establishes a standard framework (Distribution Statements) and markings for managing, sharing, safeguarding, and disseminating technical documents, such as IEPD artifacts, in accordance with policy and law. [9] MilOps documents including IEPD artifacts with distribution statements A through D are expected to be encountered routinely (Figure 1.)

DoD Distribution Statements
DISTRIBUTION A. Approved for public release: distribution unlimited.
DISTRIBUTION B. Distribution authorized to U.S. Government agencies (reason) (date of determination). Other requests for this document shall be referred to (controlling DoD office).
DISTRIBUTION C. Distribution authorized to U.S. Government agencies and their contractors (reason) (date of determination). Other requests for this document shall be referred to (controlling DoD office).
DISTRIBUTION D. Distribution authorized to Department of Defense and U.S. DoD contractors only (reason) (date of determination). Other requests for this document shall be referred to (controlling DoD office).

Figure 1: DoD Distribution Statements A-D (IAW DoDI 5230.24).

A MillOps update briefing was provided to the NIEM Executive Director on 19 Dec 19 during which the decision was made to ask the RTT to expand its analyses to include requirements for a restricted repository.

The NBAC-NTAC IEPD Registry/Repository Tiger Team (R2TT) was established in November 2019. Initial R2TT findings, as briefed to the NIEM Executive Steering Council (ESC) in December 2019, suggested that a near term solution set include the following elements:

- Public Registry on NIEM.gov
- Public IEPDs held by originators, and a
- Mission Specific MilOps Repository hosted on an available platform like All Partners Network (APAN).

This document captures requirements to address those near term objectives as well as identifying requirements that could be implemented for some future “to be” solution. Additionally, this document explores the concept of a Public Repository.

Document roadmap - This document is organized as follows:

Section 1 - The genesis for this SRS is recounted. Key concepts and definitions are introduced which apply throughout the document such as registry, repository, user/search customer, registrant, scope, use case, functional and non-functional requirements.

The subsequent three sections (sections 2, 3, and 4) focus on three major use cases:

Section 2 - National Information Exchange Model (NIEM) Public Information Exchange Package Documentation (IEPD) Registry

Section 3 - NIEM Restricted Registry/Repository

Section 4 - NIEM Public Repository

Each of these concepts with supporting requirements build on each other. The Restricted Registry/ Repository in Section 3, leverages much of the public registry requirements developed in Section 2, but adds identity and access management functionality as well as more robust privilege controls and the upload, storage, and download of IEPDs. Likewise, the Restricted Registry/Repository in Section 3 serves as the pathfinder for a public repository addressed in section 4.

Sections 2, 3 and 4 are organized similarly. Each of these sections considers assumptions, constraints, limitations/risks and scope individually. The major use case diagram is presented first, depicting the relationships between actors and activities. Then, for registries, the discussion is broadly divided between search and registration functional requirements as in section 1, followed by non-functional requirements. For, repositories, as in section 4, discussion is focused on user download of IEPDs and registrant upload of IEPDs. Section 3 includes both registry and repository requirements in addition to accounting for access controls.

While assumptions, constraints and limitations/risks are addresses individually for each registry/repository concept, several core assertions are common to all:

- The development of new software (funded by government sponsors) will be open-source.
- Development efforts will seek to balance community needs against complexity and cost in a phased and modular approach with updates/modules released on an independent schedule as completed.
- The development of NIEM registries/repositories will support native integration with NIEM IEPD tools as defined in the NIEM Tool strategy.

1.1. Scope

A well-defined scope sets expectations among project stakeholders. The scope statement is a written confirmation of the results a project will produce and the constraints and assumptions under which the project will operate.

A **scope diagram** is a graphical outline of the main functionality of the system. This type of diagram can bring focus to the entire project as it identifies the boundaries of the system. Two conventional scope diagrams are the **context diagram** and **use case diagram**. The context diagram depicts the project scope at a high level of abstraction. This diagram deliberately reveals nothing about the system internals: no information about functionality, architecture, or look-and-feel. [10,11]

The use case diagram, by contrast, provides a richer scope representation than the context diagram because it provides a high-level look at the system's capabilities, not just at its external interfaces. This project will rely on use case diagrams to visualize system functions and boundaries and devolve system requirements.

1.2. Use Case Diagram

A **use case diagram** (Figures 2 & 11) depicts the interactions between a role (known in the Unified Modeling Language (UML) as an actor) and a system to achieve a goal. The **actor** is an entity (a person, group, organization, another system or service) that interacts with a system in order to provide information to, or receive information from the system. It highlights the major piece of functionality offered by the system and identifies the usage of the functionality. [11]

The systems under consideration have three **primary actors**: User, Registrant and Administrator:

- A **User** refers to a use case actor that interacts with a registry or repository, the system. The User is also referred to as the **Search Customer**. In the case of a registry search, the User searches for IEPD registrations which provide a path outside the system to retrieve an actual IEPD. In the case of a repository search, the User searches for IEPD and then downloads the IEPD within the system directly.

- A **Registrant** refers to a Use Case actor that interacts with a registry or repository, the system. The Registrant has two possible roles:
- **New Registrant** - registering a new IEPD. In the case of interaction with a repository, the New Registrant also submits a new IEPD for validation and publishing to the repository.
- **Update Registrant** - updating (changing, adding or deleting metadata) from a previous IEPD registration record or deleting an entire previous registration record. In the case of interaction with a repository, if the IEPD itself needs updating or removal from the repository, the Update Registrants submits the updated IEPD for validation and publishing to the repository or requests removal of an existing IEPD from the repository.

- An **Administrator** is the actor who is responsible for the configuration and reliable operation of system. The **NMO Administrator** is subordinate to the DHS Engineer for the NIEM Public Registry and performs delegated system administration functions.

1.3. Functional Requirements

A functional requirement (FR) captures the intended behavior of the system. This behavior may be expressed as services, tasks or functions the system is required to perform.3

Use cases have quickly become a widespread practice for capturing functional requirements. This is especially true in the object-oriented community where they originated, but their applicability is not limited to object-oriented systems. The current effort relies on Use Case diagrams and Use Case descriptions to identify and capture functional requirements. [11]

1.4. Non-Functional Requirements

A non-functional requirement (NFR) is a requirement that specifies criteria that can be used to judge the operation of a system or the constraints under
which the entire system must operate (such as performance requirements, security, or reliability) rather than specific behaviors. They are contrasted with functional requirements that define specific behavior or functions.[11]

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15. DHS Management Directives (MD) No: 0450.1, "DHS Memoranda of Understanding (MOU) and Memoranda of Agreement (MOA)," https://www.dhs.gov/xlibrary/assets/foia/mgmt_directive_0450%201_mou_moa.pdf
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17. DHS Sensitive Systems Handbook, https://www.dhs.gov/sites/default/files/publications/4300A%20Sensitive-Systems-Handbook-v12_0-508Cs.pdf
18. Homeland Security Acquisition Regulation, February 2019, https://www.dhs.gov/sites/default/files/publications/CPO_HSAR_4.pdf
19. The Homeland Security Act of 2002, codified in Title 6, US Code, https://www.dhs.gov/sites/default/files/publications/hr_5005_enr.pdf
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22. ADA Section 508 - https://www.section508.gov/manage/laws
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2. NIEM Public IEPD Registry

2.1. Preface

The NIEM Public Registry is a place, such as a web-service/web-presence for people to register IEPDs to enable discovery and IEPD re-use. The registry is distinguished from a repository or registry/repository in that IEPDs cannot be uploaded and users would have to go beyond the registry system boundary to download an IEPD. The public aspect means the registry is available to users and registrants without logon credentialing or access controls. This is in contrast to the Restricted Registry/Repository described in section 3 where login controls and identity and access management are central to the system. In the case of the Public Registry, a User (Search Customer) can access the registry and conduct a search anonymously, although the system does prompt for a voluntary name and email address for feedback. The registrant can access the system anonymously, but the IEPD registration process requires POC information disclosure to the NMO. This information can be masked from a User (not disclosed in search results) at the registrant's discretion.

2.2. Assumptions

- The NIEM Public IEPD Registry will be hosted on NIEM.gov.
- DHS will provide the registry infrastructure and content framework for the registry.
- The back end framework for the registry will be Drupal 8.

- Anonymous users are able to access the registry and search for IEPDs. Registrants may access the registry anonymously, but the registration process includes entering Point-of-Contact (POC) information.
- The Drupal 8 +modules hosted within the DHS instantiation will support an anonymous user downloading a csv file to a client device.
- The registrant has the option to restrict sensitive information from being displayed to the User (Search Customer), such as Point-of-Contact (POC) information or Uniform Resource Locater (URL) or Uniform Resource Identifier (URI). All registration metadata is available to the NMO Administrator. The NMO Administrator can facilitate as a third party between a User and Registrant to allay any privacy concerns.
- The system will support faceted searches.
- The system will support tool tips.
- The system will include a help page in addition to tool tips.
- At Initial Operating Capability (IOC), the NIEM Public Registry will not be fully populated with IEPD registrations. The NMO will advertise the NEIM Public Registry through a STRATCOM communications campaign and work with the NBAC and the NIEM Community of Interest (COI) at large to encourage IEPD registration. In addition, the NMO Administrator will work in the background to validate and transition known historical records into the registry. As resources permit, some historical IEPD registrations may be loaded into the registry prior to IOC.
- The DODCIO, among others, has identified a need to capture NIEM usage data including the demographics of enduring clients/Domains as well as potential new NIEM adopters. The RTT has agreed to decouple this requirement from the NIEM Public Registry scope. As such, usage and demographic data will be collected separately
- The following DHS policies and federal regulations among others pertain:
    - DHS Policy Requirements
        - DHS Instruction Manual 102-01-001 Acquisition Management Instruction/Guidebook, “Systems Engineering Life Cycle (SELC)”
        - DHS Management Directives (MD) No: 0450.1, “DHS Memoranda of Understanding (MOU) and Memoranda of Agreement (MOA)”
        - DHS MD 4010.2, Section 508 Compliance, “Section 508 Program Management Office & Electronic and Information Technology Accessibility”
        - DHS Sensitive Systems Policy Directive 4300A
    - Regulatory Requirements
        - Homeland Security Acquisition Regulation, Chapter 30, Subchapter A-General
        - Section 1535 of Title 31, United States Code (Economy Act)
        - The Homeland Security Act of 2002, codified in Title 6, US Code. [14-20]

2.3. Constraints

- Compliance with DHS and Federal standards, policy and rules place constraints on the scope, functions and implementation of the NIEM Public Registry on NIEM.gov. [12-22]
- DHS rules preclude managed accounts (no user logon controls, user identity management, user access controls or user profiles).
- The system shall be hosted in a secure environment.
- The system shall be accessible via http protocol.

2.4. Limitations/Risks

- A persistent issue identified as a principal reason previous registry/repository attempts have failed is that without some self/auto-populating feature, the task of registering IEPDs eventually becomes so onerous for the community that members decline to register new IEPDs or updates. Subsequently, the registry becomes stale over time.
- DHS has a repository for mass storage, however, it is not integrated with Drupal 8.

2.5. Scope

The NIEM Public Registry is envisioned as a web-service hosted on NIEM.gov where IEPDs are registered to enable enterprise discovery and IEPD re-use. DHS will provide the overall infrastructure and manage the enterprise. The back-end framework is Drupal 8. The NMO will act as the intermediary between DHS and the public and serve as the site and repository administrator. The registry will conform to Federal and DHS standards, policy and rules. As such, the registry supports anonymous access and use.

Managed accounts and collection of user profile information is beyond the scope of this project. A listing of pertinent assumptions, constraints and limitations defining system boundaries is found in Sections 2.1 – 2.3. The functional requirements are subsequently specified in terms of use cases Section 2.6 and use case descriptions Sections 2.7 – 2.10. Non-Functional requirements of the system are listed in Section 2.12, Figure 9.

2.6. Functional Requirements

The functional requirements for the NIEM Public Registry project are delineated in Sections 2.7 - 2.10. The use case methodology is employed to devolve requirements. Use cases typically have two main components: use case diagrams (Section 2.6), which graphically describe actors and their use cases, and the text of the use case itself (Sections 2.7-2.12).

2.7. Use Case Diagram - NIEM Public IEPD Registry

The NIEM Public IEPD Registry Use Case Diagram depicted below (Figure 2.) includes three primary actors: the User, Registrant, and NMO Administrator. The User searches the registry for IEPDs. The Registrant registers IEPDs in the system to enable enterprise discovery and IEPD re-use. The NMO Administrator validates and publishes registrations and is the bridge between the public and DHS. The diagram also shows two secondary actors: DHS Engineer and System. The DHS Engineer manages and maintains the registry and the System (as an actor) receives alerts. The diagram groups behaviors into two main categories: search and registration. These major sets of behaviors include sequence diagrams to tie individual behavior together. The corresponding use case descriptions are detailed in Sections 2.7-2.12.

2.8. Search

The following Registry Search Process Sequence Diagram (Figure 3.) depicts the sequential activities involved in the process of conducting a registry search as delineated in the NIEM Public Registry Use Case Diagram (Figure 2.) and use case descriptions UC: 2 - UC: 4. The system help features are available on all registry webpages as tool tips and as Help (UC: 5) and Contact Us links/icons on the menu bar.

2.8.1. UC 1: User (Search Customer) Accesses NIEM.gov & Navigates to Search Page

2.8.1.1. Purpose

- A User (Search Customer) accesses the public NIEM.gov Homepage and navigates to the NIEM Public IEPD Registry Search Page.

2.8.1.2. Actors

- User (Search Customer).

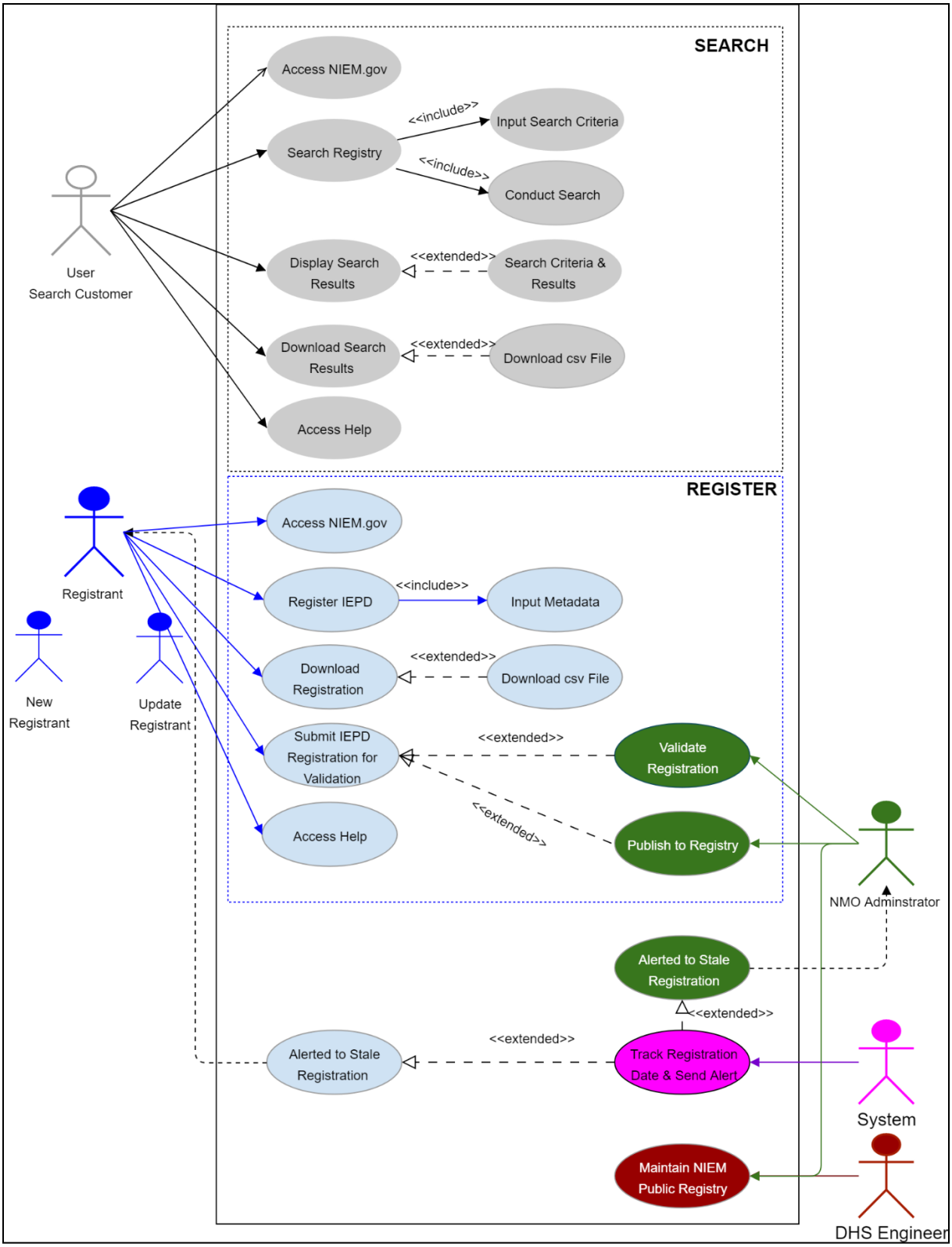

Figure 2: NIEM Public Registry Use Case Diagram

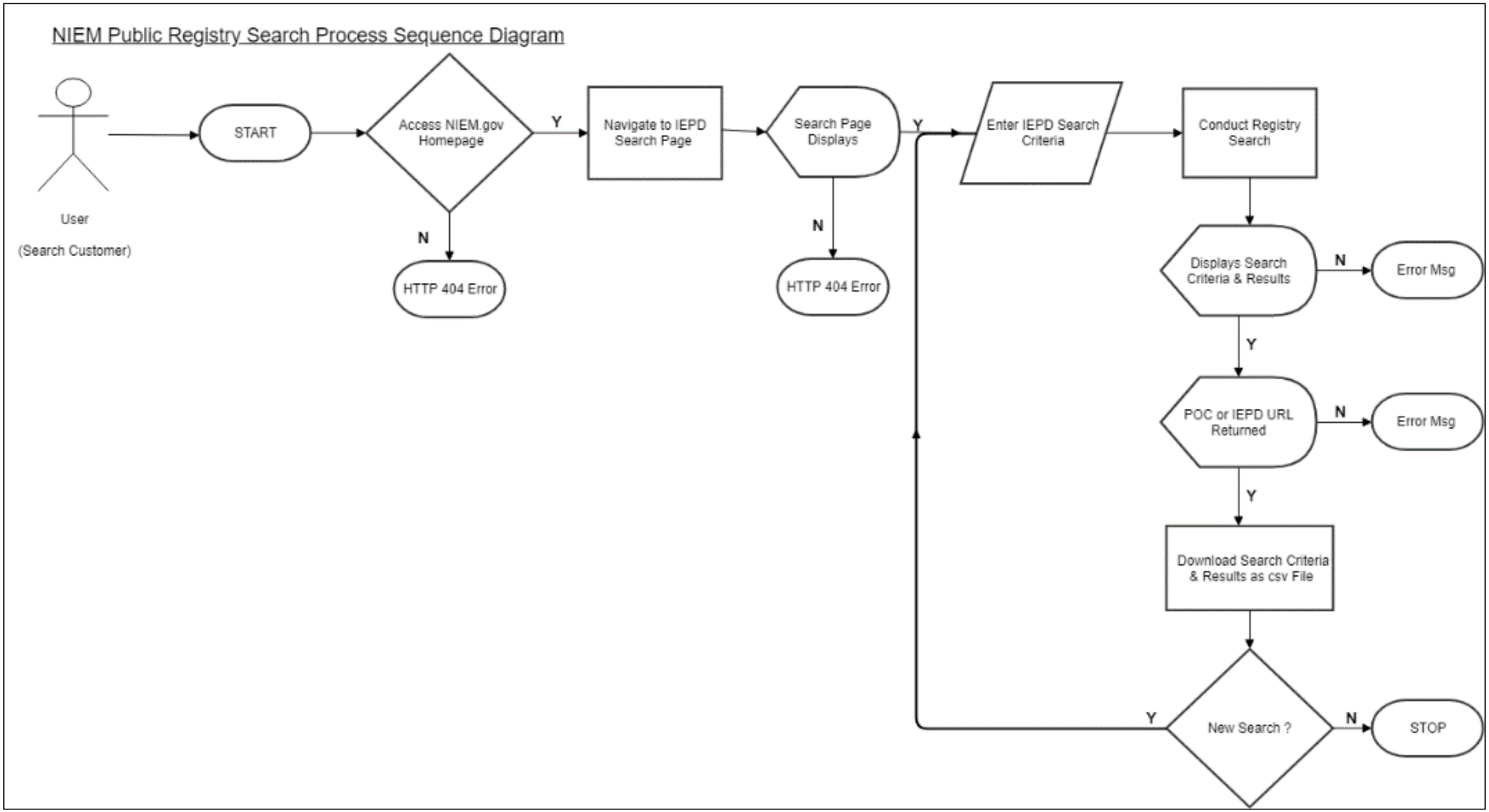

Figure 3: NIEM Public Registry Search Process Sequence Diagram.

2.8.1.3. Pre-conditions

- User (Search Customer) has access to internet.

2.8.1.4. Post conditions

- The IEPD Search Page is displayed.

2.8.1.5. Main Flow

- The User (Search Customer) accesses the NIEM.gov Homepage.
- The User (Search Customer) navigates to the NIEM Public Registry Search page.

2.8.1.6. Exceptions

- The NIEM.gov Homepage cannot be accessed and a HTTP 404 error message is returned.
- The NIEM IEPD Public Registry Search Page cannot be accessed and a HTTP 404 error message is returned.

2.8.2. UC 2: Conduct Registry Search

2.8.2.1. Purpose

- The User (Search Customer) accesses the NIEM.gov Homepage, navigates to the IEPD Registry Search Page, inputs search criteria and conducts a registry search.

2.8.2.2. Actors

- User (Search Customer)

2.8.2.3. Pre-conditions

- Search Page displays.
- The following search criteria are available to the User (Search Customer) to conduct a search: IEPD Title (keyword text search), IEPD Domain (drop-down menu), NIEM Version # (drop-down menu), Registrant Organization/Agency/Entity (text search), IEPD Description (text search), IEPD Version # (numerical search), TAGS/Keywords (text search), Primary POC (text search) (Figure 4).
- A valid User search requires a value be entered into at least one of the following search fields: IEPD Title, NIEM Domain, NIEM Version #, or Registering Organization/Agency otherwise an error is returned Figure 4 (shaded in yellow). A valid search may return no matches.
- The following Boolean operators are available for complex user search: AND (&), conditional AND (&&), OR (I), conditional OR (II), exclusive OR (XOR) and NOT (NOT) (Figure 5).
- The following WILDCARD operators and special characters are available for complex search: (*), (?), (#), (" "), and [brackets] (Figure 5).
- A Help link/icon is displayed on the menu bar which redirects the user to a Help webpage. The Help Page explains in detail how the Search tool works and the options available to the User. Tools tips provide information about an item being hovered over such as an icon, image, hyperlink, or other element.

NIEM Public Registry IEPD Search Criteria		
Search Fields	**Parameter(s)**	**Notes**
IEPD Title[1, 2]	Text	Maximum 500 characters; Boolean & special characters permitted; single WILDCARD (*) returns all registered IEPDs. IF blank, NIEM Domain or NIEM Version # or Organization/Agency must contain a value otherwise an error is returned.
NIEM Domain[1]	Drop-down Menu	The following Domain parameters are selectable: Agriculture, Biometrics, Cyber, Emergency Management, Immigration, Human Services, MilOps, Justice, Surface Transportation, CBRN, Intelligence, International Trade, Infrastructure Protection, Screening, All Domains. All Domains returns all IEPD registrations associated with Domains. CTRL-click selects multiple Domains. IF blank, nothing selected, then IEPD Name or NIEM Version # or Organization/Agency must contain a value otherwise an error is returned.
NIEM Version #[1]	Drop-down Menu	The following NIEM Version #s are selectable: 1.0, 1.1, 1.2, 2.0, 2.1, 2.2, 3.0, 3.1, 3.2, 4.0, 4.1, 4.2, WILDCARD (*). WILDCARD (*) returns all registered IEPDs. CTRL-click selects multiple Domains. IF blank, IEPD Name or NIEM Domain or Organization/Agency must contain a value otherwise an error is returned.
Registering Organization/Agency/Entity[1, 2, 3]	Text	Maximum 50 characters; Boolean & special characters permitted; single WILDCARD (*) returns all registered IEPDs. IF blank, IEPD Name or NIEM Domain or NIEM Version # must contain a value otherwise an error is returned.
IEPD Description[2]	Text	Maximum 1000 characters; Boolean & special characters permitted. May be left blank, not mandatory search field.
IEPD Version #	Number	Maximum 4 characters. (Number Format XXX.X), Range 1.0-100.9.
Primary POC[2]	Text	Search name, maximum 50 characters; Boolean & special characters permitted.
TAGS/Keywords[2]	Text	Maximum of 20 TAGS of 50 characters per TAG; Boolean & special characters permitted. May be left blank, not mandatory search field.

1. The User must input text/select drop-down menu parameters for at least one of the corresponding four search categories (IEPD Title, NIEM Domain, NIEM Version or Registering Organization/Agency/Entity) to conduct a valid search.
2. Text entries are not case sensitive.
3. Registering Organization/Agency/Entity accepts a baseline set or acronyms. As new registrations are received, the list of acceptable acronym matches will be updated.

Figure 4: Table Listing NIEM Public Registry Search Parameters

NIEM Public Registry Boolean Operators, Wildcards & Special Characters		
Search Type	**Operator & Special Character**	**Description**
AND, All of the search terms must be found	& (Boolean search only)	The "&" operator combines two search terms. Documents found contain both terms. Example search: functional & specification
Conditional AND, It is similar to the Boolean logical operator "&," except for the condition when the first operand returns false, the second operand will not be evaluated.	&& (Boolean search only)	The "&&" operator combines two search terms. Documents found contain both terms. Example search: functional && specification
OR, One of the search terms must be found	I (Boolean search only)	The "I" operator retrieves all documents which contain at least one of the terms entered. Example search: agenda I minutes
Conditional OR, The evaluation of the second operand does not occur if the first operand is evaluated as true.	II (Boolean search only)	The "II" operator retrieves all documents which contain at least one of the terms entered. Example search: agenda II minutes
Exclusive OR, is a logical operator which results true when either of the operands are true (one is true and the other one is false) but both are not true and both are not false.	XOR (Boolean search only)	The XOR operator retrieves all documents which contain either but not both of the terms entered. Example search: agenda XOR minutes
Exclude a search term	NOT (Boolean search only)	The NOT operator excludes a search term from the search results. It can be used as a standalone operator or in conjunction with AND or OR. Example search: agenda AND NOT minutes
WILDCARD	Asterisk: market*	The "*" character matches any number of characters in its position. Example search: market* matches "markets", "marketing", and so on. Note: This character cannot be used as the first character in a search term.
Any single character	Question mark: appl?	The "?" character matches any single character except a whitespace or underscore character (_) in its position.

		Example search: appl? matches both "apply" and "apple". Note: This character cannot be used as the first character in a search term.
Any single digit	Hash: 201#	The "#" character matches any single digit in its position. Example search: 201# matches, for example, "2017" and "2018". Note: This character cannot be used as the first character in a search term.
Exact match	Quotation marks: "phrase"	Enclose the search words in quotation marks to find objects that contain all of the search terms in the given order. Example search: "functional specification"
Find this or that, Explicit characters or a range of characters	Brackets [xyx]	xyz finds every occurrence of x, or y, or z in every word throughout the document (but not x, y, and z together).

Figure 5: Table Listing NIEM Public Registry Boolean Operators, Wildcards and Special Charters.

2.8.2.4. Post conditions

- The search tool returns both the currents session search criteria and associated search results. If neither POC nor IEPD URL is returned as a search result, an error message directing the User (Search Customer) to contact the NMO for assistance is displayed. The Contact Us link is available on the menu bar.

2.8.2.5. Main Flow

- The User (Search Customer) accesses the NIEM.gov Homepage.
- The User (Search Customer) navigates to the NIEM Public Registry Search page.
- The User (Search Customer) enters the faceted search criteria.
    - As a minimum, the User (Search Customer) must enter a text or select a parameter from a drop-down menu in at least one of the following search categories: IEPD Title, NIEM Domain, NIEM Version #, or Registering Organization/Agency; otherwise, an error is returned. - "Invalid search, enter text or select a parameter from a drop-down menu in at least one of the following search categories : IEPD Title, NIEM Domain, NIEM Version #, or Registering Organization/Agency and try again".
    - A Wildcard will return all results corresponding to a search category (examples: a Wildcard (*) in the IEPD Title category will return the entire registry.
    - CTRL-click will select multiple parameters within a search category (example: Biometrics CTRL-click Surface Transportation, will return results for both domains.
- The User (Search Customer) will be prompted to download the current session or conduct another search.
- If another search is intended, the User can simply change a facet (add, change or delete a facet) of the current search session and conduct a new search or clear all search criteria and start a fresh search.
- The system is configured to execute a pop-up after search results are displayed to the User. The pop-up message requests that the User voluntarily provide name, email and phone number information to the NMO

so that contact can be made with the User subsequent to his experience interacting with the registry. After a predefined period, the system sends an email query to the User to solicit a response to a series of questions. The objective of this survey is twofold. First, a series of Likert scale questions examine the User's overall impression of using the registry. Second, predicated on the User retrieving IEPDs after his registry search, a series of questions asks the User to score the re-use value of the IEPDs retrieved. The survey also includes a text box where the User can add additional comments. The survey is returned via email to the NMO. The details of the survey are beyond the scope of this document, but captured as a non-functional requirement.

2.8.2.6. Exceptions

- No results match the search parameters entered (Error message displays "No matches available").
- Mandatory search parameters not entered (Error message displays - "Invalid search, enter text/select a parameter in at least one of the following search categories: IEPD Title, NIEM Domain, NIEM Version #, or Registering Organization/Agency and try again".

2.8.3. UC 3: Display Search Criteria and Search Results

2.8.3.1. Purpose

- The search criteria and search results for the current search are displayed for the User (Search Customer).

Figure 6. lists the categories for the domain of results available for display. Those superscripted 1 correspond to mandatory Search criteria (i.e 1 of the 4 fields must be completed to conduct a valid search). Those superscripted 2 correspond to mandatory metadata fields which the Registrant must complete. POC and IEPD URL may be hidden from the User (Search Customer). In that case, the User (Search Customer) should contact the NMO to facilitate access to the actual IEPD or Registrant POC.

NIEM Public Registry Search Criteria Result Categories		
IEPD Title [1, 2]	IEPD Version # [2, 3]	IEPD Description [1, 2, 3]
Date Submitted (auto-fill during registration)	IEPD Version # Description [3]	Keywords/TAGS [3]
NIEM Domain [1]	NIEM Conformance [3]	IEPD Artifacts [3]
Registering Organization/Agency/ Entity [1]	Primary POC [1, 2, 3]	Other Supporting Documentation [3]
NIEM Version #[1]	Secondary POC [3]	
NIEM Version # Rationale [3]	IEPD URL (Restricted	

	Repository Equity) [2, 3]	

1. Mandatory Search Criteria: IEPD Title or NIEM Domain or Registering Org or NIEM Version #.
2. The Registrant must input the IEPD Title, Primary POC (Last Name, First Name, MI. and email address), IEPD Version#, and URL or IEPD Description.
3. Superscript 3 fields may be hidden from the User (Search Customer)

Figure 6: Table Listing NIEM Public Registry Search Criteria and Search Results Categories.

2.8.3.2. Actors

- User (Search Customer)

2.8.3.3. Pre-conditions

- A search was conducted with search criteria matching registry content.

2.8.3.4. Post conditions

- Search criteria and results are displayed.

2.8.354. Main Flow

- The results of the current search and associated search criteria are displayed to the User (Search Customer).

2.8.3.6. Exceptions

- A search is executed but the Display Page is not returned and a HTTP 404 error message is returned.
- No POC or IEPD URL returned (Error message displays - "Contact NMO for additional Information using the NIEM Contact Us link.

2.8.4. UC 4: Download SEARCH Results

2.8.4.1. Purpose

- The User (Search Customer) downloads the current search session (search criteria and results) as a csv file.

2.8.4.2. Actors

- User (Search Customer)

2.8.4.3. Pre-conditions

- The User's (Search Customer's) current search session (search criteria and results) is available for download.

2.8.4.4. Post conditions

- The User's current search session is downloaded to the User's device as a csv file.

2.8.4.5. Main Flow

- User (Search Customer) downloads the current search session (search criteria and results).

2.8.4.6. Exceptions

- Download fails.

2.8.5. UC 5: Access Help Page

2.8.5.1. Purpose

- The Help Page provides detailed explanations of how to use the NIEM Public Registry. It includes directions on how to conduct a registry search or register and IEPD. These explanations and directions are more comprehensive and in addition to tool tips which provide information about an item being hovered over such as an icon, image, hyperlink, or other element. The Contact Us link/icon is accessible within the Help Page or from the Menu Bar. The Contact Us Page provides the User (Search Customer) or Registrant the opportunity to discuss issues encountered when using the repository, report error messages, request additional help or pose questions to the NMO Administrator.

2.8.5.2. Actors

- User (Search Customer)

2.8.5.3. Pre-conditions

- A Help link/icon appears on the menu bar of all registry webpages.

2.8.5.4. Post conditions

- The Help Page is displayed.

2.8.5.5. Main Flow

- The User or IEPD Registrant clicks the Help link/icon and is directed to the Help Page.
- The User or IEPD Registrant may access the Contact Us link with the Help Page or from the Menu Bar.
- The User or IEPD Registrant closes out the Help Page and returns to Search or Registration

2.8.5.6. Exceptions

- The Help Page cannot be accessed and a HTTP 404 error message is returned.

2.9. Registration

The following Registry Registration Process Sequence Diagram (Figure 7.) depicts the activities involved for inputting registration metadata to register an IEPD, update an existing registry registration record or delete an existing registry registration record as detailed in the Use Case descriptions UC: 7 - UC: 11.

2.9.1. UC 6: Registrant Accesses NIEM.gov & Navigates to the Registration Page

2.9.1.1. Purpose

- A Registrant accesses the public NIEM.gov Homepage and navigates to the NIEM Public IEPD Registry Registration Page.

2.9.1.2. Actors

- Registrant
  - New Registrant
  - Update Registrant - Registrant that updates an existing record (adds or deletes content to a previous registration) or deletes an entire previously registered IEPD.

2.9.1.3. Pre-conditions

- Registrant has access to internet
- The registrant has accessed the NIEM.gov Homepage and navigates to the Registration Page.

2.9.1.4. Post conditions

- The IEPD Registration Page is displayed.

2.9.1.5. Main Flow

- The Registrant accesses the NIEM.gov Homepage.
- The Registrant navigates to the NIEM Public Registry IEPD Registration Page.

2.9.1.6. Exceptions

- The NIEM.gov Homepage cannot be accessed and a HTTP 404 error message is returned.
- The NIEM IEPD Public Registry IEPD Registration Page cannot be accessed and a HTTP 404 error message is returned.

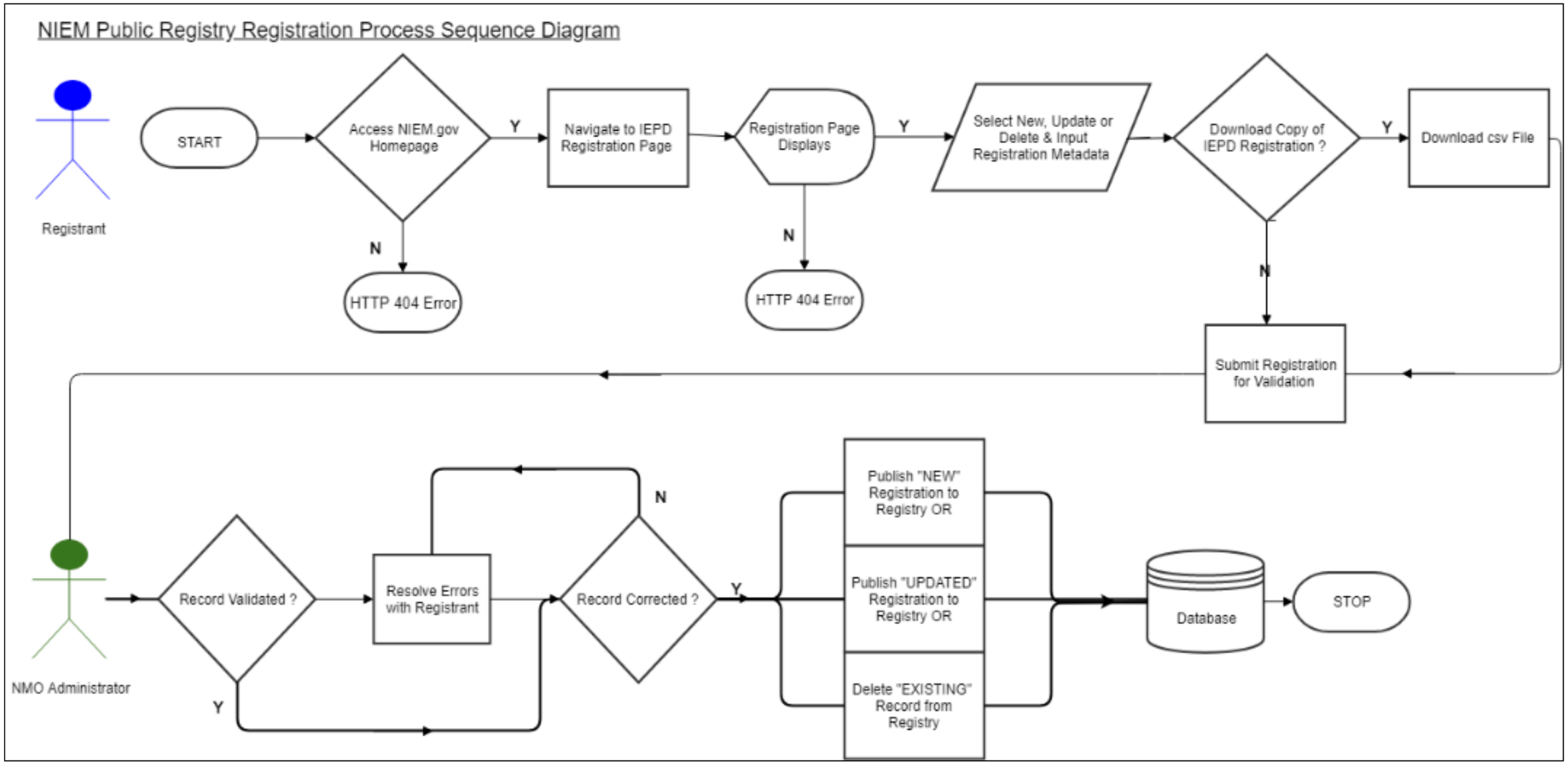

Figure 7: NIEM Public Registry IEPD Registration Process Sequence Diagram.

2.9.2. UC 7: Input Metadata Parameters to Register an IEPD to the NIEM Public Registry

2.9.2.1. Purpose

- Enter metadata parameters to register/update an IEPD registration in the NIEM Public IEPD Registry.

2.9.2.2. Actors

- Registrant
  - New Registrant
  - Update Registrant - Registrant that updates an existing record (adds or deletes content to a previous registration) or deletes an entire previously registered IEPD.

2.9.2.3. Pre-conditions

- The Registrant has accessed the NIEM.gov Homepage.
- The Registrant has navigated to the NIEM Public Registry IEPD Registration Page.
- The IEPD Registration Page is displayed.
- The Registrant has selected New IEPD or Update IEPD or Delete IEPD Registration button.
- The IEPD Registration Page indicates New IEPD or Update or Delete registration.

The mandatory and optional NIEM Public Registry Registration Metadata Fields are displayed in Figure 8.

NIEM Public IEPD Registry Metadata Registration Fields and Parameters				
IEPD Registration Metadata Field Categories	**Mandatory Field Entry (M)** **Optional Field Entry (O)**	**Registrant may hide the following fields from the User for privacy reasons** ⭐ **Note - all data is available to NMO Administrator and DHS Engineer.**	**Parameter(s)**	**Notes/Specifications**
IEPD Title	**M**		Text	Maximum 500 characters. IEPD Title must be entered for valid submission otherwise error message returned when submitted.
Date submitted	**-**	**-**	Text	System Autofill
NIEM Domain	**O**		Drop-down Menu	The following Domain parameters are selectable as input: Agriculture,

				Biometrics, Cyber, Emergency Management, Immigration, Human Services, MilOps, Justice, Surface Transportation, CBRN, Intelligence, International Trade, Infrastructure Protection, Screening, Other.
Registering Organization/Agency/Entity	**O**		Text	Maximum 50 characters.
NIEM Version #	**O**		Drop-down Menu	The following NIEM Version #s are selectable as input: 1.0, 1.1, 1.2, 2.0, 2.1,2.2, 3.0, 3.1, 3.2, 4.0, 4.1, 4.2,
NIEM Version # Rationale	**O**		Text	Maximum 500 characters.
IEPD Version #	**M**		Text	Maximum 4 characters. (Number Format X.X -XXX.X), Range 1.00-100.9
IEPD Version# Description	**O**		Text	This metadata field describes where in the lifecycle of the IEPD this registration resides. It is divided between a set of check-boxes and a free text area. **IEPD Status:** • • Planned • Under Development • In Production • IOC • Final • Update • Historical • Under Revision • Other A free text area (500 characters) is available to more thoroughly describe where in the lifecycle the IEPD resides.
NIEM Conformance	**O**		Yes/No	Self-assessment of conformance. Radio buttons.
Primary Point-of-Contact (POC)	**M/O**		Text	Form Fill. Full Name (Last Name, First Name, MI) **[Mandatory]**, Primary Phone Number, Secondary Phone Number, Primary Email **[Mandatory]**, Secondary Email, Organization.

Secondary Point Of Contact (POC)	**O**		Text	Form Fill. Full Name (Last Name, First Name, MI), Primary Phone Number, Secondary Phone Number, Primary Email, Secondary Email, Organization.
IEPD URL	**M***		URL	Maximum 100 characters. Valid URL to where IEPD stored. Either an IEPD URL or IEPD Description is **mandatory.**
IEPD Description	**M***		Text	Maximum 2000 characters. Either an IEPD URL or IEPD Description is **mandatory**.
Keywords/TAGS	**O**		Text	Form Fill of 20 TAGS/Keywords. Maximum 50 characters per entry.
IEPD Artifacts	**O**		Checklist & Text	This meatdata field describes the required and optional artifacts associated with the IEPD. It is divided between a set of check-boxes and a free text area. **IEPD Artifact Checklist:** [29] • • NIEM Schema Subset **[required]** • Constraint schema • Extension Schema • Reference Schema **[required]** • mpd-catalog (IEPD unique identification, Conformance targets, basic info about IEPD, Key artifacts and directory structure, Relationship to other MODs and their artifacts) **[required]** • changelog **[required]** • readme **[required]** • iep sample **[required]** • code lists • conformance assertion • xml-catalog

				• wantlist • • **Other IEPD Lifecycle Artifacts - Scenario Planning** • Business Process Diagrams • Use Case Diagrams • Sequence Diagrams **- Analyze Requirements** • Business Rules • Business Requirements **- Map & Model** • Exchange Content Model • Mapping Document A free text area (500 characters) is available to list additional artifacts.
Other Supporting Documentation	O		Text URI/URL	Form Fill, Maximum 10 entries, Title and URI/URL.
The registration template also includes a 2000 character text field not discoverable by the User that is available for communicating with the Administrator to facilitate validation of the registration record. This field is of particular importance for update and delete actions to assist with resolving any ambiguity about the record to be changed or deleted.				

Figure 8: NIEM Public IEPD Registry Metadata Registration Fields & Parameters

2.9.2.4. Post conditions

- The completed IEPD Registration Page is displayed.

2.9.2.5. Main Flow

- The Registrant selects New, Update or Delete IEPD registration.
- The Registrant inputs the appropriate metadata parameters:
    - **New Registration**
        - The Registrant completes the mandatory IEPD metadata registration fields.
        - The Registrant completes the optional IEPD metadata fields as appropriate/desired.
        - The Registrant selects those fields available to be hidden from the User (Search Customer).
        - The Registrant self-validates/reviews all metadata entries.

- **Update Registration**
    - The Registrant enters the (Exact) IEPD Title, submission date and IEPD version # for the registration record to be changed.
    - The Registrant completes the mandatory IEPD metadata registration fields entering updates as appropriate.
    - The Registrant completes the optional IEPD metadata fields entering updates as appropriate.
    - The Registrant selects those fields available to be hidden from the User (Search Customer).
    - The Registrant self-validates/reviews all metadata entries.
    - NOTE- once validated, the updated record will replace the original record.
- **Delete Registration**
    - The Registrant enters the (Exact) IEPD Title and IEPD version # for the registration record to be deleted.
    - The Registrant self-validates/reviews all metadata entries.

2.9.2.5. Exceptions

- None.

2.9.3. UC 8: Download Registration

2.9.3.1. Purpose

- The Registrant downloads the current session (New, Update or Delete Registration record) to a device as a csv file.

2.9.3.2. Actors

- Registrant
    - New Registrant
    - Update Registrant - Registrant that updates an existing record (adds or deletes content to a previous registration) or deletes an entire previously registered IEPD.

2.9.3.3. Pre-conditions

- The current session/registration is complete and available for download.

2.9.3.4. Post conditions

- The input parameters from the Registrant's current session are downloaded to the Registrant's device as a csv file.

2.9.3.5. Main Flow

- Registrant downloads current session/registration as csv file.

2.9.3.6. Exceptions

- Download fails.

2.9.4. UC 9: Submit Registration for Validation

2.9.4.1. Purpose

- The Registrant submits the IEPD registration (New, Update, or Deletion) metadata to the NMO for validation.

2.9.4.2. Actors

- Registrant
    - New Registrant
    - Update Registrant - Registrant that updates an existing record (adds or deletes content to a previous registration) or deletes an entire previously registered IEPD.
- NMO Administrator

2.9.4.3. Pre-conditions

- The current registration session is available for submission to the NMO Administrator for validation.

2.9.4.4. Post conditions

- The Registrant's current session Registration is submitted to the NMO Administrator for validation.

2.9.4.5. Main Flow

- The Registrant submits current session Registration.
- A message appears - "Successful Submission".

2.9.4.6. Exceptions

- The submission fails and an error message appears - "Submission Failure".

2.9.5. UC 10: Validate Registration

2.9.5.1. Purpose

- The NMO Administrator validates an IEPD Registration.
- A Standard Operating Procedure (SOP) for validating registrations and IEPDs is specified as a non-functional requirement for the registries and repositories under consideration. As a prerequisite of the validation process, it is available to the Administrator for validation guidance of registrations and IEPD artifacts presented for inclusion in the registry/repository. In both cases, validation requires manual intervention by the Administrator or a group of designated "experts" to vette registrations and IEPDs. The process is envisioned to include several focus areas:

    - Formal Validation_-Does the IEPD and registration conform to NIEM norms and to registry/repository minimum mandatory requirements?
    - Domain Appraisal - Does the IEPD have a favorable Domain endorsement?
    - User Evaluation – Is the User community consensus that the IEPD is useful for re-use?
    - NIEM Appraisal – for IEPDs supporting the same class of exchanges, does the IEPD under review represent the best instance to be recommended and promoted as the NIEM standard for the class; likewise, should other similar IEPDs/ versions and the associated registrations be deprecated/demoted in comparisons to the chosen standard for the class?

- Formal Validation and Domain Appraisal are primary checks before registrations or IEPDs are posted to the registry/repository. User Evaluations and NIEM Appraisals are more deliberative and rely on cooperating Users.
- Although the delineation of specific business rules governing the vetting process is beyond the scope of this document, the NMO Administrator should consider engaging with the original IEPD registrant (if different from the current registrant) when an IEPD is being updated or deleted.

2.9.5.2. Actors

- NMO Administrator

2.9.5.3. Pre-conditions

- Registrant's IEPD registration metadata (New, Update or Delete) is submitted and available to the NMO Administrator for review.

2.9.5.4. Post conditions

- A valid IEPD New registration is ready for publishing to the registry.
- A valid IEPD Update registration is ready for publishing to the registry.
- A valid request for deletion of a record currently in the registry is ready for processing.

2.9.5.5. Main Flow

- The NMO Administrator reviews the registration for completeness and accuracy.
- The NMO Administrator conducts liaison with the Registrant and corrects any errors or inconsistencies with the registration metadata.
- The validated registration is ready for publishing to the registry or a deletion request is ready for processing.

2.9.5.6. Exceptions

- The NMO cannot contact the Registrant for correction and cannot validate and publish or delete a registration.

2.9.6. UC 11: Publish Registration or Delete Former Record

2.9.6.1. Purpose

- The NMO Administrator publishes a validated IEPD registration to the Registry.

2.9.6.2. Actors

- NMO Administrator

2.9.6.3. Pre-conditions

- A validated IEPD registration or deletion is ready for publication/deletion.

2.9.6.4. Post conditions

- A validated IEPD registration is published to the registry and available for search and discovery.
- A former stale or incorrect record is deleted from the registry.

2.9.6.5. Main Flow

- The NMO Administrator publishes an IEPD registration to the registry or deletes a former record.

2.9.6.6. Exceptions

- The registration does not post to the Registry and an error message displays - "Publication Failure".

2.9.7. UC 12: Access Help Page

2.9.7.1. Purpose

- The Help Page provides detailed explanations of how to use the NIEM Public Registry. It includes directions on how to conduct a registry search or register and IEPD. These explanations and directions are more comprehensive and in addition to tool tips which provide information about an item being hovered over such as an icon, image, hyperlink, or other element. The Contact Us link/icon is accessible within the Help Page or from the Menu Bar. The Contact Us Page provides the User (Search Customer) or Registrant the opportunity to discuss issues encountered when using the repository, report error messages, request additional help or pose questions to the NMO/NMO Administrator.

2.9.7.2. Actors

- IEPD Registrant
    - New Registrant
    - Update Registrant - registrant that updates or deletes an existing record (adds, changes or deletes content to a previous registration record) or deletes a previous registration in its entirety.

2.9.7.3. Pre-conditions

- A Help link/icon appears on the menu bar of all registry webpages.

2.9.7.4. Post conditions

- The Help Page is displayed.

2.9.7.5. Main Flow

- The User or IEPD Registrant clicks the Help link/icon and is directed to the Help Page.
- The User or IEPD Registrant may access the Contact Us link with the Help Page or from the Menu Bar.
- The User or IEPD Registrant closes out the Help Page and returns to Search or Registration

2.9.7.6. Exceptions

- The Help Page cannot be accessed and a HTTP 404 error message is returned.

2.10. Alert Notification

2.10.1. UC 13: Alert

2.10.1.1. Purpose

- The system auto-notifies a Registrant and the NMO Administrator that a registration needs to be reviewed to insure currency.

2.10.1.2. Actors

- System
- NMO Administrator
- Registrant

2.10.1.3. Pre-conditions

- Staleness threshold set by NMO Administrator.

2.10.1.4. Post conditions

- System sends alert to Registrant and NMO Administrator when threshold exceeded.

2.10.1.5. Main Flow

- The system tracks IEPD registration dates and sends an alert to Registrant and NMO Administrator when a preset staleness threshold is exceeded.

2.10.1.6. Exceptions

- The Registrant email address is unavailable to the system and the NMO receives an error message.
- The Registrant's email is invalid and the NMO receives an error message.

2.11. System Maintenance

2.11.1. UC 14: Maintain and Administer Registry

2.11.1.1. Purpose

Maintain and administer the infrastructure, system, operations, software and bug fixes associated with the NIEM Public Registry.

2.11.1.2. Actors

- DHS Engineer
- NMO Administrator

2.11.1.3. Pre-conditions

- System operation must comply with DHS standards, policy and rules.

2.11.1.4. Post conditions

- Registry system operational on NIEM.gov.

2.11.1.5. Main Flow

- Conduct housekeeping, maintenance and bug fixing tasks to keep the system in compliance with DHS standards, policy and rules and enable the operation of a NIEM Public Registry on NEIM.gov.

2.11.1.6. Exceptions

- None.

2.12. Non-Functional Requirements

R Category	Non-Functional Requirements
Audit	• The system should incorporate an audit capability so all create, read, update, and delete actions are stored in an audit database. • Data should be hidden from view until a suitable time frame passes and then it can be deleted
Accessibility	• The system shall be functional on all industry-standard browsers including Microsoft Edge, Mozilla Firefox, and Google Chrome. • The system must be available on the Internet. • The system must be usable by mobile devices.
Availability	• The system should be operational no less than 99% of the time. • Maintenance procedures should be delivered as part of the system documentation. • Maintenance procedures in accordance with (IAW) Federal DHS standards, policy and rules. • The system shall include Restore and reactivate procedures should be delivered as part of the system documentation. • Restore and reactivate procedures in accordance with DHS standards, policy and rules • The NMO will respond to queries via NIEM.gov Contact Us within 1 working day.
Backup and Restore	• The primary system administrator, or designated alternative administrator, should be responsible for all backup and restore operations • The storage medium should be as appropriate for sponsor guidelines. • A full backup should be completed weekly with a daily incremental backup performed between the weekly backups. • Backup data should be retained in accordance with Sponsor, directives, and guidelines.
Capacity	• The memory and storage requirements should be part of the system documentation listed as minimum system requirements. • The memory and storage requirements should be in accordance with DHS guidelines.

Certification and Compliance	• The system shall comply with Federal regulations and DHS standards, policy and rules. See section 1.5 References and Section 2.1 Assumptions. • The system shall comply with IT Accessibility Laws and Policies ADA Section 508.

Documentation	• The documentation should comply with Federal and DHS directives, and guidelines.
	• The system shall include standard system documentation including, but not limited to:
	  ○ User Guides
	  ○ Online Help capability
	  ○ Source Code
	  ○ Data Model
	  ○ Technical Manuals
	• A Standard Operating Procedure (SOP) for validating registrations and IEPDs is specified as a non-functional requirement for the registries and repositories under consideration. As a prerequisite of the validation process, it is available to the Administrator for validation guidance of registrations and IEPD artifacts presented for inclusion in the registry/repository. In both cases, validation requires manual intervention by the Administrator or a group of designated "experts" to vette registrations and IEPDs. The process is envisioned to include several focus areas:
	• Formal Validation_-Does the IEPD and registration conform to NIEM norms and to registry/repository minimum mandatory requirements?
	• Domain Appraisal - Does the IEPD have a favorable Domain endorsement?
	• User Evaluation – Is the User community consensus that the IEPD is useful for re-use?
	• NIEM Appraisal – for IEPDs supporting the same class of exchanges, does the IEPD under review represent the best instance to be recommended and promoted as the NIEM standard for the class; likewise, should other similar IEPDs/ versions and the associated registrations be deprecated/demoted in comparisons to the chosen standard for the class.
	
	Formal Validation and Domain Appraisal are primary checks before registrations or IEPDs are posted to the registry/repository. User Evaluations and NIEM Appraisals are more deliberative and rely on cooperating Users.
	
	• The delineation of specific business rules governing the vetting process is beyond the scope of this document, but is acknowledged as an essential non-functional requirement to codify the validation process. User Survey documentation- The system is configured to send an email to the User subsequent to his experience interacting with the repository. After a predefined period, the system sends an email query to the User to solicit a response to a series of questions. The objective of this survey is twofold. First, a series of Likert scale questions examine the User's overall impression of using the registry.
	• Second, predicated on the User retrieving IEPDs after his IEPD search, a series of questions asks the User to score the re-use value of the IEPDs retrieved. The survey also includes a text box where the User can add additional comments. The survey is returned via email to the Administrator. The details of the survey are beyond the scope of this document, but captured as a non-functional requirement.

Efficiency	• The system should notify the user of an error with information describing the error in a non-technical manner, for example, if a text box requires dates in a specific format the user should be notified where the text box exists and what format the date should be in.

	• The system should record all errors and store them in a database for future analysis.
Interoperability	• All time stamps should be in coordinated universal time (UTC) or Zulu time.
Maintainability	• Maintainability procedures should be delivered as part of the system documentation.
Modifiability	• IAW Federal and DHS, regulations and guidelines. • The system shall incorporate free open-source development framework and libraries where possible. • The system shall allow localization of language variables in case developers would like to translate for external use. • The system shall be designed to support the English-speaking user in the United States (en_US.UTF-8 locale).
Privacy	• IAW Federal and DHS guidelines.
Procedures	• IAW this SRS, Federal, and DHS guidelines.
Redundancy	• IAW Federal and DHS guidelines.
Resource Management	• The GUI, tool tips and Help Pages should be sufficient for the User and/or Registrant to interact successfully with the repository without formal training. You Tube videos demonstrating key system capabilities would be useful with link to the repository Help Pages.
Security (RFM)	• Provide documentation that shows how the RMF requirements have been addressed.
Performance	• TBD
Portability	• The system should be portable. So moving from one OS to other OS does not create any problem.

Figure 9: Table Listing NIEM Public Registry Non-Functional Requirements.

3. NIEM Restricted IEPD Registry/Repository

3.1. Preface

The NIEM Restricted IEPD Registry/Repository is a place, such as a web-service/web-presence for people to register and upload IEPDs to enable discovery, download and IEPD re-use. The NIEM Restricted IEPD Registry/Repository is distinguished from the NIEM Public Registry, Section 2, in that the Public Registry simply lists IEPDs for discovery and points to locations, but does not provide for IEPD upload, download and storage within the system boundary. Paramount to the NIEM Restricted Registry/Repository is implementation of identity and access management controls, hence "Restricted".

3.2. Assumptions

- The NIEM Restricted IEPD Registry/Repository requirements assume a Federal sponsor. If no Federal governance is imposed, these requirements will need to be reviewed to delete Federal requirements/constraints, standards, policy, rules, regulations and guidelines.
- The NIEM Restricted IEPD Registry/Repository requirements are agnostic to those standards, policies, and rules specific to a particular Federal sponsor, department or agency.
- The NIEM Restricted IEPD Registry/Repository requirements are agnostic to a specific host platform or back-end content framework.
- Managed accounts, identity and access management requirements are presumed, but are treated notionally since the constraints or standard implementation imposed by a specific Federal sponsor are unknown. The NIEM Public Repository placed a premium on "ease of use" by both User and Registrant. In contrast, the NIEM Restricted IEPD Registry/Repository community places a premium on identity and access controls that guarantee the proper access of potential subscribers to Repository equities. As such, the Restricted Repository imposes more comprehensive requirements on mandatory disclosure of User information (User profiles) and documentation of IEPD registration metadata than in the case of the NIEM Public Registry.
- These requirements are not resource constrained except as explicitly defined in Section 3.2 Constraints..
- IEPDs registered for discovery includes both IEPDs resident within the Restricted Repository and IEPDs available from sources outside the NIEM Restricted IEPD Registry/Repository boundry.
- The fact that a User or User Group can search and discover an IEPD registration, does not necessarily qualify that User/User Group access to or download privileges to a Restricted Repository IEPD equity.
- Since profile information is collected, usage and demographic data can be collected and individual activities associated with a specific User or Registrant's tracked.

3.3. Constraints

- System operation must comply with Federal standards, policies and rules for Federal clients, but are agnostic to those standards, policies, and rules specific to a particular department or agency.
- The system shall be hosted in a secure physical environment.
- The system shall be accessible via http protocol.
- The following documents and conformance constraints among others pertain: [1-8, 20-23]

    - Executive Order 13556 "Controlled Unclassified Information".
    - 32 CFR Part 2002, "Controlled Unclassified Information".
    - Federal Information Processing Standards Publication 199, "Standards for Security Categorization of Federal Information and Information Systems".
    - Federal Information Processing Standards Publication 200, "Minimum Security Requirements for Federal Information and Information Systems".

- NIST Special Publication 800-53, Revision 4, "Security and Privacy Controls for Federal Information Systems and Organizations".
- NIST Special Publication 800-88, Revision 1, "Guidelines for Media Sanitization,".
- NIST Special Publication 800-171, Revision 1, "Protecting Controlled Unclassified Information in Non-federal Systems and Organizations."
- NIST Special Publication 800-171A, "Assessing Security Requirements for Controlled Unclassified Information.
- Section 1535 of Title 31, United States Code (Economy Act).
- United States Web Design Standards (USWDS).
- ADA Section 508.
- 21st Century IDEA Act.

3.4. Limitations/Risks

Since the requirements for the NIEM Restricted IEPD Registry/Repository are agnostic of a specific sponsor, limitations and risks are difficult to classify. Resource constraints (infrastructure, staffing, and costs) as well as sponsor rules, policy and regulations may impose constraints with associated limitations/risks. Resourcing the development of a NIEM Restricted IEPD Registry/Repository will likely impose cost risks. Particularly the labor burden (Full Time Equivalents) and associated cost for a custodian(s)/custodial services to maintain the repository is likely not trivial.

3.5. Scope

The NIEM Restricted IEPD Registry/Repository Scope Diagram shows several use cases and the set of interactions between external actors and the system under consideration. The primary actors are the User (Search customer) whose purpose is discovering and downloading IEPDs, the Registrant, whose purpose is registering or updating an IEPD and uploading a new or updated IEPD to the repository, and the administrator who validates and publishes or deletes registrations and/or IEPDs to the Restricted Registry/Repository. Secondary actors include Engineers, and the System/Services whose purpose is to maintain the infrastructure and provision identity and access services.

3.6. Functional Requirements

The functional requirements describe the core functionality of the application. The NIEM Restricted IEPD Registry/Repository leverages the work done by the R2TT on defining the NIEM Public Registry. The major points of departure from the NIEM Public Registry include:

- Robust Identity and access management capabilities
- Registrant upload, storage, update and deletion of the actual IEPDs, not just cataloging registrations as in the case of a registry, and
- User (Search Customer) downloading IEPDs from a dedicated repository within the system boundary, not just discovery that points to a POC or URL for IEPD retrieval

These departures are highlighted in yellow (under Logon) or outlined in red on the NIEM Restricted IEPD Registry/Repository Use Case Diagram (Figure 11) and illustrate the major differences between a public registry and restricted registry/repository. Other capabilities not available to the NIEM Public Registry flow from identity and access control processes. The capability for a User (Search Customer) or Registrant to register and create an account and profile, and for an administrator or service to assign roles and privileges to specific actors based on verified profiles, enable tracking User /Registrant actions throughout their engagement with the system, and collecting usage and demographics on these Users and Registrants' activities for analytics.

For our purposes, identity and access management (IAM/IDAM), identity, credential, and access management (ICAM) or User Profile and Access Control System (UPAC) all represent variations on concepts, general methodologies and components to manage both identity and access processes. Our discussion is agnostic to vendor implementation or sponsor standards, policy, rules and regulations. Figure 10. illustrates the building blocks of identity and access management and the identity lifecycle.

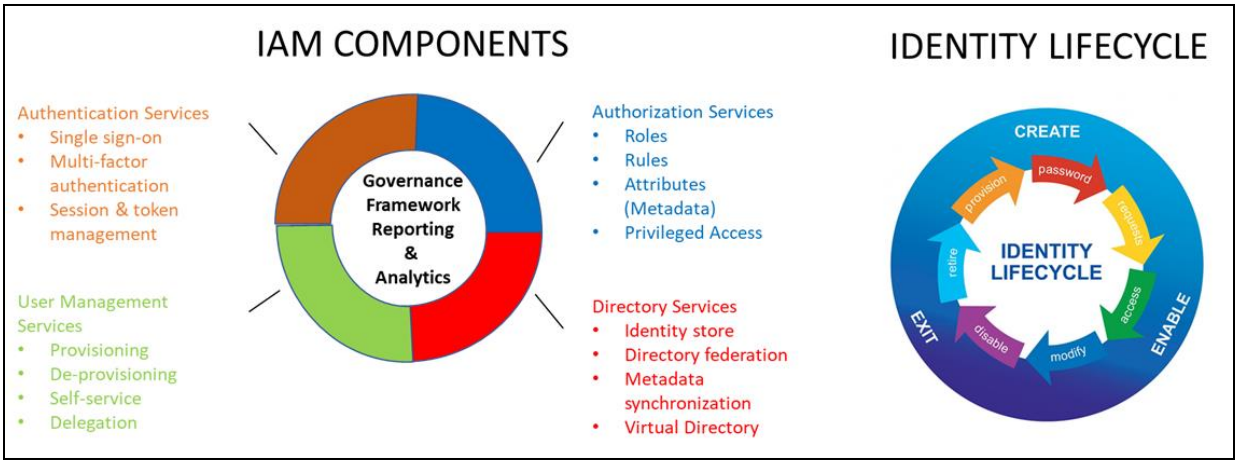

Figure 10: NIEM Restricted Repository IAM Components & Identity Lifecycle Diagrams

3.7. Use Case Diagram - NIEM Restricted IEPD Registry/Repository

The NIEM Restricted IEPD Registry/Repository Use Case Diagram depicted below (Figure 11.) includes three primary actors: the User, Registrant, and Administrator. The User searches, discovers and downloads IEPDs. The Registrant registers IEPDs in the system and uploads IEPDs to the repository to enable enterprise discovery and IEPD re-use. The Administrator validates and publishes registrations and IEPDs and is the bridge between the Users and Registrants. The diagram also shows three secondary actors: Engineer, System and Services. The Engineer manages and maintains the repository. The System (as an actor) generates alerts and assists in provisioning identity and access management. Services (as an actor) may assist in provisioning identity and access management. The diagram groups behaviors into two main categories: search including download and registration including upload. These major sets of behaviors include sequence diagrams to tie individual behaviors together. The Use Case descriptions are detailed in Sections 3.9-3.11.

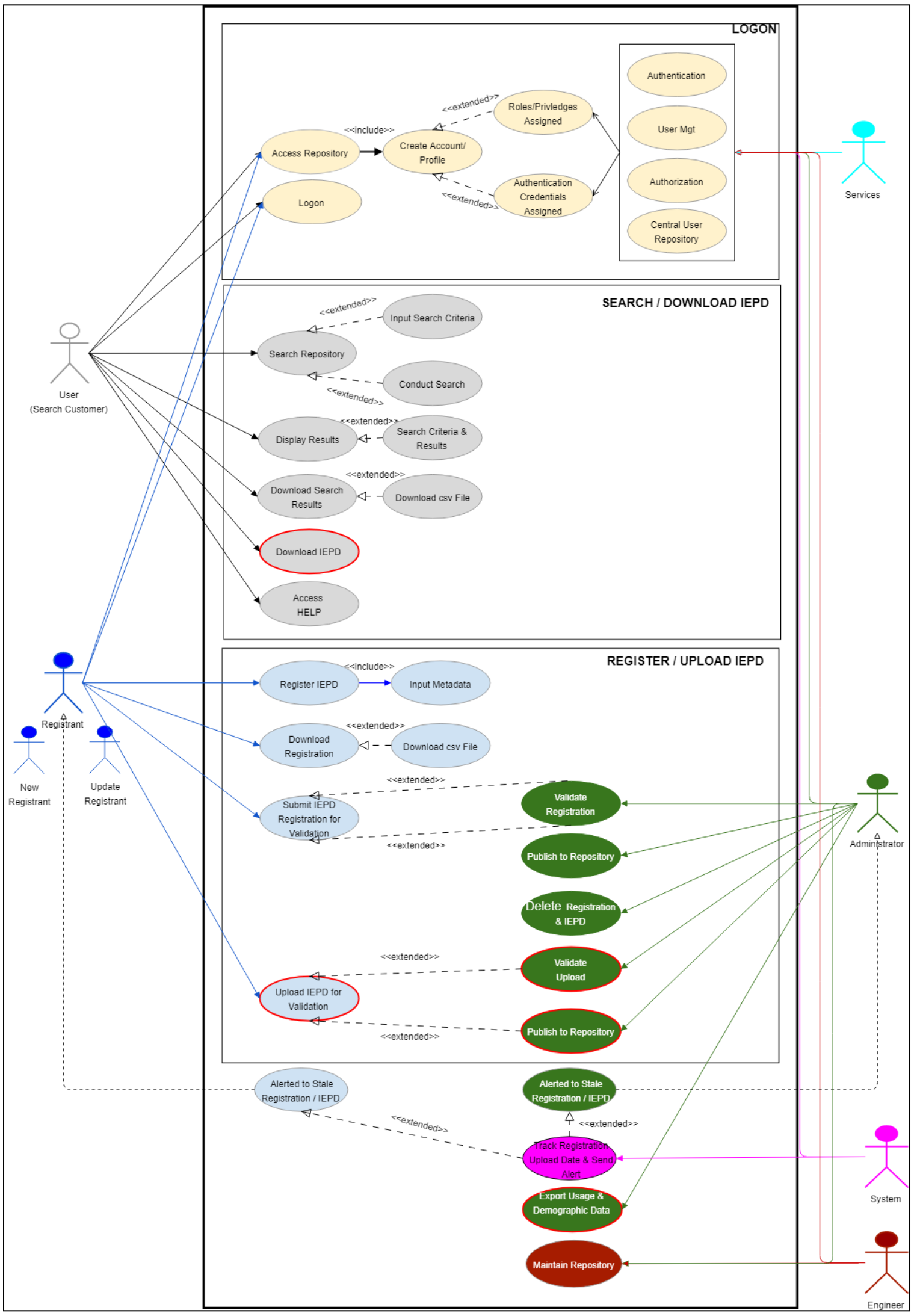

Figure 11: NIEM Restricted Registry/Repository Use Case Diagram.

3.8. Logon

The NIEM Restricted IEPD Registry/Repository Logon IAM Sequence Diagram (Figure 12.) depicts UC: 1 and UC: 2 activities associated with identity and access management. It starts with a User (Search Customer) or a Registrant accessing the Restricted Registry/Repository Homepage and either creating an account and profile and/or logging on to the Restricted Registry/Repository. The identity and access management controls are notional and many configurations are possible or feasible depending on host organization standards, policies, rules, infrastructure, vendor services and enterprise choices. Once logon is complete, the User/Registrant navigates to either the Search or Registration page.

3.8.1. UC 1: Access the NIEM Restricted IEPD Registry/Repository Homepage

3.8.1.1. Purpose

- A User (Search Customer)/Registrant accesses the Restricted IEPD Registry/Repository Homepage.

3.8.1.2. Actors

- User (Search Customer)
- Registrant
    - New Registrant - registers and uploads an IEPD.
    - Update Registrant - updates or deletes an existing record (adds, changes or deletes content to a previous registration record or deletes a previous registration in its entirety) or updates or deletes an IEPD.

3.8.1.3. Pre-conditions

- User/Registrant has access to internet

3.8.1.4. Post conditions

- The Restricted IEPD Registry/Repository Homepage is displayed.
- The User (Search Customer)/Registrant proceeds to create an account/logon.

3.8.1.5. Main Flow

- The User/Registrant accesses the Restricted IEPD Registry/Repository Homepage.
- The User/Registrant navigates to the Restricted IEPD Registry/Repository Logon.

3.8.1.6. Exceptions

- The Restricted IEPD Registry/Repository Homepage cannot be accessed and a HTTP 404 error message is returned.

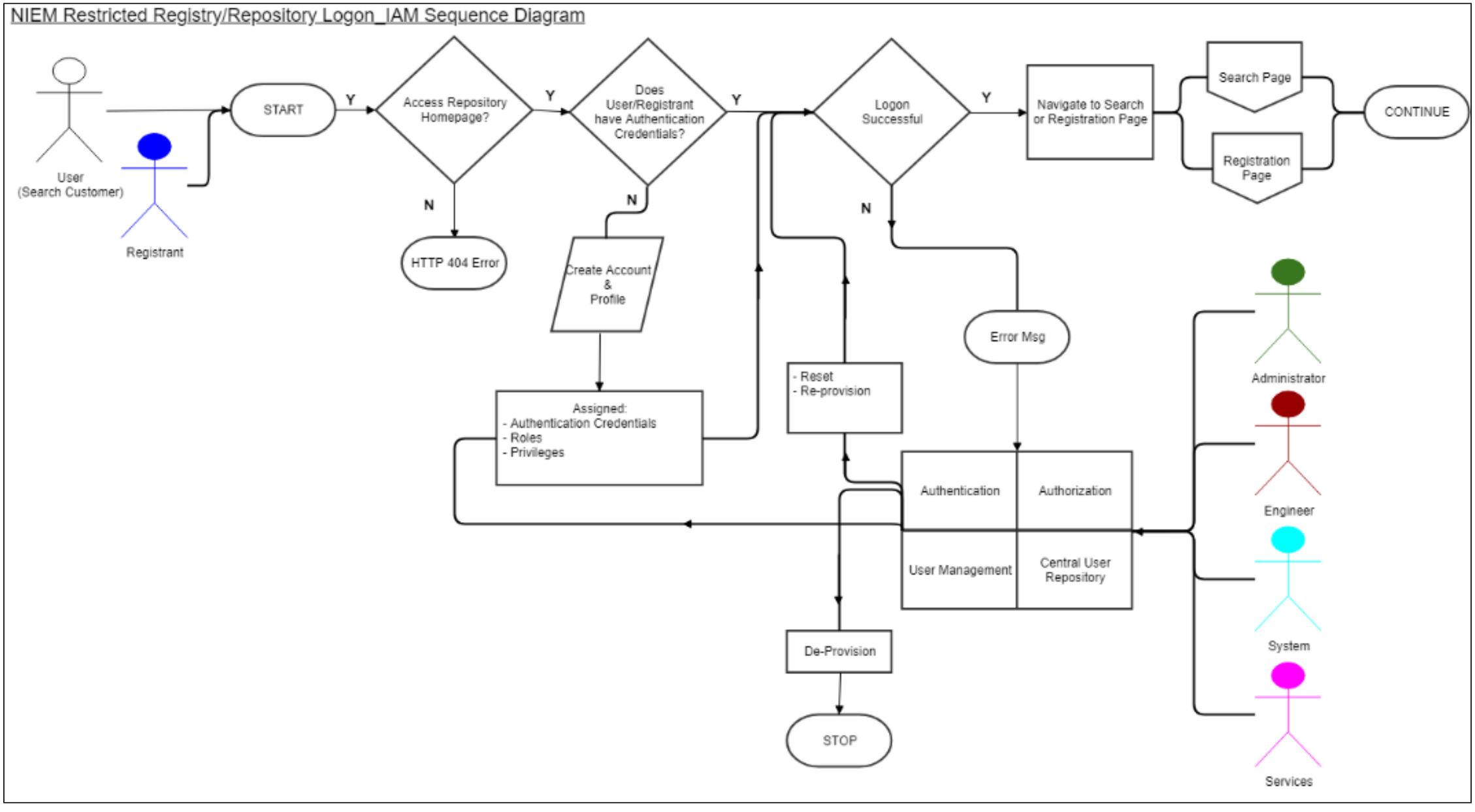

Figure 12: NIEM Restricted Registry/Repository Logon IAM Sequence Diagram.

3.8.2. UC 2: Create Account/ Logon to the NIEM Restricted IEPD Registry/Repository

3.8.2.1. Purpose

- A User/Registrant accesses the Restricted IEPD Registry/Repository Homepage navigates to the Logon page and creates an account/profile and/or logons (Figure 12).

3.8.2.2. Actors

- User (Search Customer)
- Registrant
    - New Registrant - registers and uploads an IEPD.
    - Update Registrant - updates or deletes an existing record (adds, changes or deletes content to a previous registration record or deletes a previous registration in its entirety) or updates or deletes an IEPD.
- Engineer
- System
- Services Administrator

3.8.2.3. Pre-conditions

- The User (Search customer)/Registrant has access to internet.
- The User (Search Customer)/Registrant has accessed the Restricted IEPD Registry/Repository Homepage.
- The User/Registrant has an account or creates an account if first encounter.

3.8.2.4. Post conditions

- The User/Registrant has created an account if first encounter.
- The User (Search Customer) has logged on and proceeds to the Search Page.
- The Registrant has logged on and proceeds to the Registration Page.
- A User's (Search Customer's) or Registrant's authentication credentials have been de-provisioned and fails logon.

3.8.2.5. Main Flow

- A authorized User (Search Customer)/Registrant accesses the Restricted IEPD Registry/Repository Homepage and navigates to the Logon Page and logs on (Figure 12.).
- A first time User (Search Customer)/Registrant accesses the Restricted IEPD Registry/Repository Homepage and creates an account and profile and logs on (Figure 12.).
    - The specifics of creating an account and profile are dependent on the host organizations preferences, but notional mandatory (*) and elective metadata fields are listed below
        - Name (First, Last, MI) *
        - Organization/Agency *
        - Organization/Agency Address
        - Primary Phone Number *
        - Secondary Phone Number
        - Email Address *
        - Domain Association (Primary)*
        - US Citizenship (Y/N)*

        - Contractor (Y/N)*
        - Federal Government Civilian
        - Active Duty Military
        - Government/Organization Sponsor (as required)*
            - Name (First, Last, MI)
            - Organization/Agency
            - Primary Phone Number
            - Secondary Phone Number
            - Email Address.
    - Authentication credentials, roles and privileges are assigned.
    - The newly credentialed User (Search customer)/Registrant logs on.
- A logged on User (Search Customer)/Registrant proceeds to the Search or Registration Page.

3.8.2.6. Exceptions

- The Restricted IEPD Registry/Repository Homepage cannot be accessed and a HTTP 404 error message is returned.
- The Restricted IEPD Registry/Repository Logon Page cannot be accessed and a HTTP 404 error message is returned.
- The User/Registrant Logon fails (Error message displays - "Contact administrator for additional Information.

3.9. Search

The following NIEM Restricted IEPD Registry/Repository Search sequence diagram (Figure 13.) continues from Figure 12 (Logon-IAM sequence). The diagram depicts the activities involved in conducting a repository search to discover IEPDs as detailed in the Use Case descriptions UC 3 - UC 5 and download IEPDs (UC 6) stored in the repository. A distinguishing feature from the NIEM Public Registry is the capability for the User to download an actual IEPD stored in the NIEM Restricted Repository.

3.9.1. UC 3: Conduct NIEM Restricted IEPD Registry/Repository Search

3.9.1.1. Purpose

The User (Search Customer) accesses the Restricted IEPD Registry/Repository Homepage, navigates to the Logon Page, logs on, navigates to the Search Page, inputs search criteria and conducts a registry search.

3.9.1.2. Actors

- User (Search Customer)

3.9.1.3. Pre-conditions

- Search Page displays.
- The following search criteria are available to the User (Search Customer) to conduct a search: IEPD Title (keyword text search), IEPD Domain (drop-down menu), NIEM Version # (drop-down menu), Registrant Organization/Agency/Entity (text search), IEPD Description (text search), IEPD Version # (numerical search), TAGS/Keywords (text search), Primary POC (text search) (Figure 14).
- A valid User search requires a value be entered into at least one of the following search fields: IEPD Title, NIEM Domain, NIEM Version #, or Registering Organization/Agency/Entity otherwise an error is returned (Figure 14., superscript 1). A valid search may return no matches.
- The following Boolean operators are available for complex user search: AND (&), conditional AND (&&), OR (I), conditional OR (II), exclusive OR (XOR) and NOT (NOT) (Figure 15.).

- The following WILDCARD operators and special characters are available for complex search: (*), (?), (#), (" "), and [brackets] (Figure 15.).

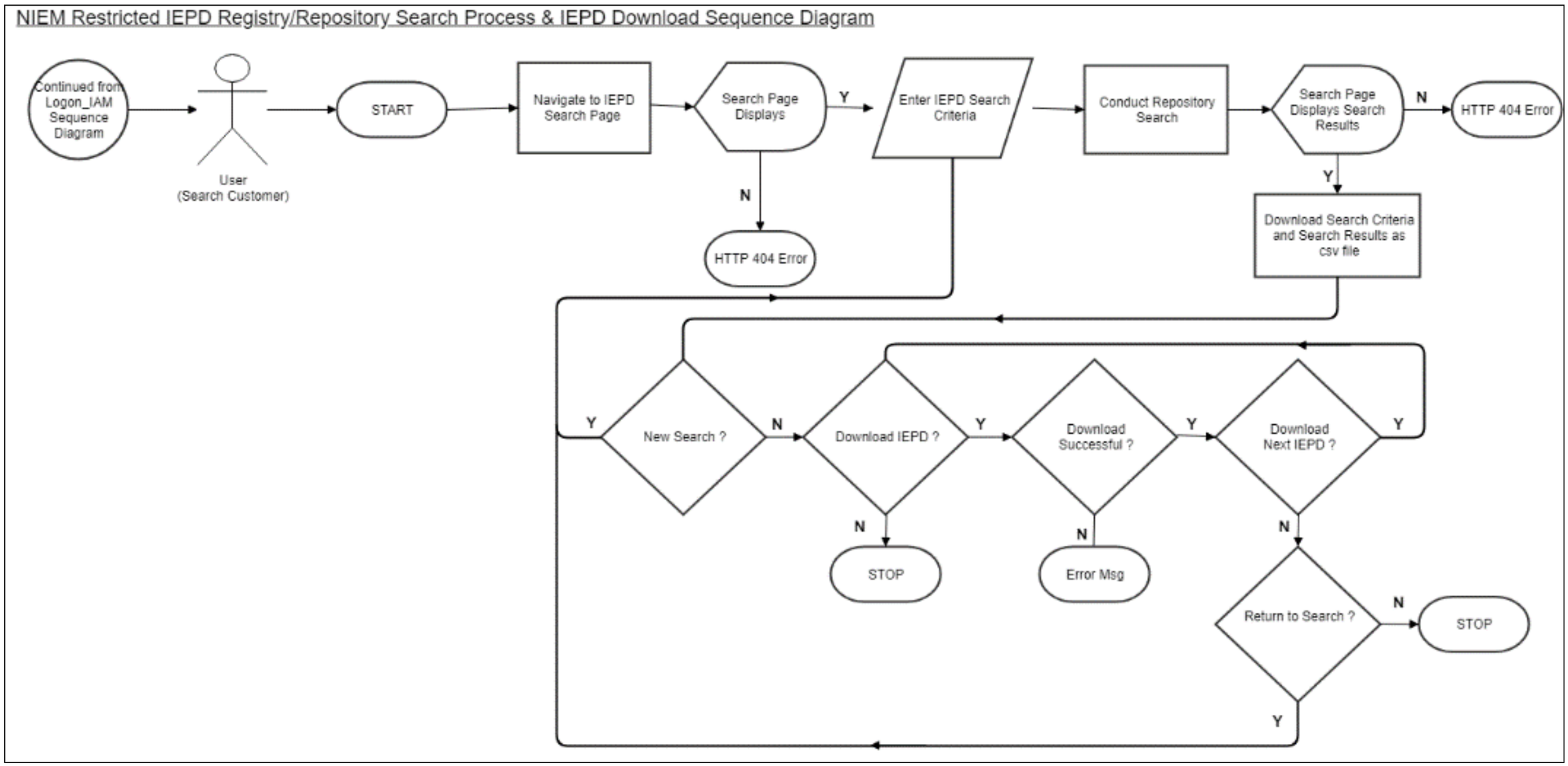

Figure 13: NIEM Restricted Registry/Repository Search Process & Download Sequence Diagram.

- A Help link/icon is displayed on the menu bar which redirects the user to a Help webpage. The Help Page explains in detail how the Search tool works and the options available to the User. Tools tips provide information about an item being hovered over such as an icon, image, hyperlink, or other element.

NIEM Restricted IEPD Registry/Repository IEPD Search Criteria		
Search Fields	**Parameter(s)**	**Notes**
IEPD Title[1,2]	Text	Maximum 500 characters; Boolean & special characters permitted; single WILDCARD (*) returns all registered IEPDs. IF blank, NIEM Domain or NIEM Version # or Organization/Agency must contain a value otherwise an error is returned.
NIEM Domain[1]	Drop-down Menu	The following Domain parameters are selectable: Agriculture, Biometrics, Cyber, Emergency Management, Immigration, Human Services, MilOps, Justice, Surface Transportation, CBRN, Intelligence, International Trade, Infrastructure Protection, Screening, "All Domains". "All Domains" returns all IEPD registrations associated with Domains. CTRL-click selects multiple Domains. IF blank, nothing selected, then IEPD Name or NIEM Version # or Organization/Agency must contain a value otherwise an error is returned.
NIEM Version #[1]	Drop-down Menu	The following NIEM Version #s are selectable: 1.0, 1.1, 1.2, 2.0, 2.1, 2.2, 3.0, 3.1, 3.2, 4.0, 4.1, 4.2, WILDCARD (*). WILDCARD (*) returns all registered IEPDs. CTRL-click selects multiple Domains. IF blank, IEPD Name or NIEM Domain or Organization/Agency must contain a value otherwise an error is returned.
Registering Organization/Agency/Entity [1, 2 ,3]	Text	Maximum 50 characters; Boolean & special characters permitted; single WILDCARD (*) returns all registered IEPDs. IF blank, IEPD Name or NIEM Domain or NIEM Version # must contain a value otherwise an error is returned.
IEPD Description[2]	Text	Maximum 1000 characters; Boolean & special characters permitted. May be left blank, not mandatory search field.
IEPD Version #	Number	Maximum 4 characters. (Number Format XXX.X), Range 1.0-100.9.
Primary POC[2]	Text	Search name, maximum 50 characters; Boolean & special characters permitted.
TAGS/Keywords[2]	Text	Maximum of 20 TAGS of 50 characters per TAG; Boolean & special characters permitted. May be left blank, not mandatory search field.

1. The User must input text/select drop-down parameters for at least one of the corresponding four search categories (IEPD Title, NIEM Domain, NIEM Version, or Registering Organization'/Agency) to conduct a valid search.
2. Text entries are not case sensitive.

3. Registering Organization/Agency/Entity accepts a baseline set or acronyms. As new registrations are received, the list of acceptable acronym matches will be updated.

Figure 14: NIEM Restricted IEPD Registry/Repository IEPD Search Parameters

NIEM Restricted IEPD Registry/Repository Boolean Operators, Wildcard & Special Characters		
Search Type	**Operator & Special Character**	**Description**
AND, All of the search terms must be found	& (Boolean search only)	The "&" operator combines two search terms. Documents found contain both terms. Example search: functional & specification
Conditional AND, It is similar to the Boolean logical operator "&," except for the condition when the first operand returns false, the second operand will not be evaluated.	&& (Boolean search only)	The "&&" operator combines two search terms. Documents found contain both terms. Example search: functional && specification
OR, One of the search terms must be found	I (Boolean search only)	The "I" operator retrieves all documents which contain at least one of the terms entered. Example search: agenda I minutes
Conditional OR, The evaluation of the second operand does not occur if the first operand is evaluated as true.	II (Boolean search only)	The "II" operator retrieves all documents which contain at least one of the terms entered. Example search: agenda II minutes
Exclusive OR, is a logical operator which results true when either of the operands are true (one is true and the other one is false) but both are not true and both are not false.	XOR (Boolean search only)	The XOR operator retrieves all documents which contain either but not both of the terms entered. Example search: agenda XOR minutes
Exclude a search term	NOT (Boolean search only)	The NOT operator excludes a search term from the search results. It can be used as a standalone operator or in conjunction with AND or OR. Example search: agenda AND NOT minutes
WILDCARD	Asterisk: market*	The "*" character matches any number of characters in its position. Example search: market* matches "markets", "marketing", and so on.

		Note: This character cannot be used as the first character in a search term.
Any single character	Question mark: appl?	The "?" character matches any single character except a whitespace or underscore character (_) in its position. Example search: appl? matches both "apply" and "apple". Note: This character cannot be used as the first character in a search term.
Any single digit	Hash: 201#	The # character matches any single digit in its position. Example search: 201# matches, for example, "2017" and "2018". Note: This character cannot be used as the first character in a search term.
Exact match	Quotation marks: "phrase"	Enclose the search words in quotation marks to find objects that contain all of the search terms in the given order. Example search: "functional specification"
Find this or that, Explicit characters or a range of characters	Brackets [xyx]	xyz finds every occurrence of x, or y, or z in every word throughout the document (but not x, y, and z together).

Figure 15: NIEM Restricted IEPD Registry/Repository Boolean Operators, Wildcards and Special Characters.

3.9.1.4. Post conditions

- The search tool returns both the currents session search criteria and associated search results. If neither POC nor IEPD URL is returned as a search result, an error message directing the User (Search Customer) to contact the Administrator for assistance is displayed. The Contact Us link is available on the menu bar.
- The system is configured to send an email to the User subsequent to his experience interacting with the repository. After a predefined period, the system sends a query to the User to solicit a response to a series of questions. The objective of this survey is twofold. First, a series of Likert scale questions examine the User's overall impression of using the Restricted IEPD Registry/Repository. Second, predicated on the User retrieving IEPDs after his IEPD search, a series of questions asks the User to score the re-use value of the IEPDs retrieved. The survey also includes a text box where the User can add additional comments. The survey is returned via email to the NMO. The details of the survey are beyond the scope of this document, but captured as a non-functional requirement.

3.9.1.5. Main Flow

- The User (Search Customer) accesses the Restricted IEPD Registry/Repository Homepage.
- The User (Search Customer) navigates to the Restricted IEPD Registry/Repository Search page.
- The User (Search Customer) enters the faceted search criteria.

- As a minimum, the User (Search Customer) must enter a text or select a parameter from a drop-down menu in at least one of the following search categories: IEPD Title, NIEM Domain, NIEM Version #, or Registering Organization/Agency; otherwise, an error is returned. - "Invalid search, enter text or select a parameter from a drop-down menu in at least one of the following search categories : IEPD Title, NIEM Domain, NIEM Version #, or Registering Organization/Agency and try again".
- A Wildcard will return all results corresponding to a search category (examples: a Wildcard (*) in the IEPD Title category will return the entire registry.
- CTRL-click will select multiple parameters within a search category (example: Biometrics CTRL-click Surface Transportation, will return results for both domains.

- The User (Search Customer) will be prompted to download the current session or conduct another search.
- If another search is intended, the User can simply change a facet (add, change or delete a facet) of the current search session and conduct a new search or clear all search criteria and start a fresh search.

3.9.1.6. Exceptions

- No results match the search parameters entered (Error message displays "No matches available").
- Mandatory search parameters not entered (Error message displays - "Invalid search, enter text/select a parameter in at least one of the following search categories: IEPD Title, NIEM Domain, NIEM Version #, or Registering Organization/Agency and try again".

3.9.2. UC 4: Display Search Criteria and Search Results

3.9.2.1. Purpose

- The search criteria and search results for the current search are displayed for the User (Search Customer).
- Figure 16. lists the categories for the domain of results available for display. Those tabular categories with superscript 1 correspond to mandatory Search criteria (i.e 1 of the 4 fields must be completed to conduct a valid search). Those tabular categories with superscript 2 correspond to mandatory metadata fields which the Registrant must complete. POC and IEPD URL may be hidden from the User (Search Customer). In that case, the User (Search Customer) should contact the NIEM Restricted IEPD Registry/Repository Administrator to facilitate access to the actual IEPD or Registrant POC.

NIEM Restricted IEPD Registry/Repository Search Criteria Result Categories		
IEPD Title [1, 2]	IEPD Version # [2, 3]	IEPD Description [1, 2, 3]
Date Submitted (auto-fill during registration)	IEPD Version # Description [3]	Keywords/TAGS [3]
NIEM Domain [1]	NIEM Conformance [3]	IEPD Artifacts [3]
Registering Organization/Agency/ Entity [1]	Primary POC [1, 2, 3]	Other Supporting Documentation [3]

NIEM Version #[1]	Secondary POC [3]	IEPD URI/URL (External to Restricted Repository) [3, 4]
NIEM Version # Rationale [3]	IEPD URL (Restricted Repository Equity) [2, 3]	

1. Mandatory Search Criteria: IEPD Title or NIEM Domain or Registering Org or NIEM Version #.
2. The Registrant must input the IEPD Title, Primary POC (Last Name, First Name, MI. and email address), IEPD Version#, and URL or IEPD Description.
3. Superscript 3 fields may be hidden from the User (Search Customer)
4. Special case where IEPD is stored at a location separate from the repository.

Figure 16: Table listing NIEM Restricted IEPD Registry/Repository Search Criteria and Result Categories.

3.9.2.2. Actors

- User (Search Customer)

3.9.2.3. Pre-conditions

- A search was conducted with search criteria matching registry content.

3.9.2.4. Post conditions

- Search criteria and results are displayed.

3.9.2.5. Main Flow

- The results of the current search and associated search criteria are displayed to the User (Search Customer).

3.9.2.6. Exceptions

- A search is executed but the Display Page is not returned and a HTTP 404 error message is returned.
- No POC or IEPD URL returned (Error message displays - "Contact NMO for additional Information using the NIEM Contact Us link).

3.9.3. UC 5: Download SEARCH Results

3.9.3.1. Purpose

- The User (Search Customer) downloads the current search session (search criteria and results) as a csv file.

3.9.3.2. Actors

- User (Search Customer)

3.9.3.3. Pre-conditions

- The User's (Search Customer's) current search session (search criteria and results) is available for download.

3.9.3.4. Post conditions

- The User's current search session is downloaded to the User's device as a csv file.

3.9.3.5. Main Flow

- User (Search Customer) downloads the current search session (search criteria and results).

3.9.3.6. Exceptions

- Download fails.

3.9.4. UC 6: Download IEPD

3.9.4.1. Purpose

- The User (Search Customer) downloads an IEPD.

3.9.4.2. Actors

- User (Search Customer)

3.9.4.3. Pre-conditions

- The User's (Search Customer's) search identifies a URL within the restricted repository to download an IEPD.
- The User's (Search Customer's) search identifies a URL pointing outside the system boundary to download an IEPD.
- The User's (Search Customer's) search identifies a POC that can facilitate sourcing an IEPD.

3.9.4.4. Post conditions

- The User's downloads an IEPD from the restricted repository.
- The User is directed outside the restricted repository boundary to source an IEPD.

3.9.4.5. Main Flow

- The User (Search Customer) downloads an IEPD from the restricted repository.
- The User (Search Customer) leaves the restricted repository to source an IEPD.

3.9.4.6. Exceptions

- Repository download fails.

3.9.5. UC 7: Access Help Page

3.9.5.1. Purpose

- The Help Page provides detailed explanations of how to use the NIEM Restricted IEPD Registry/Restricted Repository. It includes directions on how to conduct a registry search, download an IPED, register a new IEPD, update/delete an existing registration record and/or upload a new IEPD or update/delete an existing IEPD to the repository. These explanations and directions are more comprehensive and in addition to tool tips which provide information about an item being hovered over such as an icon, image, hyperlink, or other element. The Contact Us link/icon is accessible within the Help Page or from the Menu Bar. The Contact Us Page provides the User (Search Customer) or Registrant the opportunity to discuss issues encountered when using the repository, report error messages, request additional help or pose questions to the Administrator.

3.9.5.2. Actors

- User (Search Customer)

3.9.5.3. Pre-conditions

- A Help link/icon appears on the menu bar of all restricted registry/repository webpages.

3.9.5.4. Post conditions

- The Help Page is displayed.

3.9.5.5. Main Flow

- The User or IEPD Registrant clicks the Help link/icon and is directed to the Help Page.
- The User or IEPD Registrant may access the Contact Us link within the Help Page or from the Menu Bar.
- The User or IEPD Registrant closes out the Help Page and returns to Search or Registration

3.9.5.6. Exceptions

- The Help Page cannot be accessed and a HTTP 404 error message is returned.

3.10. Registration

The following NIEM Restricted IEPD Registry/Repository Registration and Upload Process Sequence Diagram (Figure 17.) continues from Figure 12 (Logon-IAM process). The NIEM Restricted Registry/Repository Registration and Upload Process Sequence Diagram (Figure 17.) depicts the activities involved in registering an IEPD to the NIEM Restricted IEPD Registry/Repository as detailed in the Use Case descriptions UC: 8 - UC: 14 and upload IEPDs to the repository (UC: 15 - UC: 17) . A distinguishing feature contrasting the NIEM Public Registry with the

NIEM Restricted Registry/Repository is the capability for the Registrant to upload an actual IEPD to the NIEM Restricted IEPD Repository within the system boundary.

3.10.1. UC 8: Registrant Accesses the NIEM Restricted IEPD Registry/Repository Homepage, Logs on & Navigates to the Restricted Registry/Repository Registration Page

3.10.1.1. Purpose

A Registrant accesses the NIEM Restricted IEPD Registry/Repository Homepage, Logs on and navigates to the Restricted Registry/Repository Registration Page.

3.10.1.2. Actors

- Registrant
    - New Registrant
    - Update Registrant - Registrant that updates an existing record (adds or deletes content to a previous registration) or deletes an entire previously registered IEPD.

3.10.1.3. Pre-conditions

- Registrant has access to internet
    - The registrant has accessed the NIEM.gov Homepage and navigates to the Registration Page.

3.10.1.4. Post conditions

- The IEPD Registration Page is displayed.

3.10.1.5. Main Flow

- The Registrant accesses the Restricted Registry/Repository Homepage.
- The Registrant Logs on and navigates to the Restricted Registry/Repository Registration Page.

3.10.1.6. Exceptions

- The Restricted Registry/Repository Homepage cannot be accessed and a HTTP 404 error message is returned.

NIEM Restricted IEPD Registry/Repository Registration and IEPD Upload Process Sequence Diagram

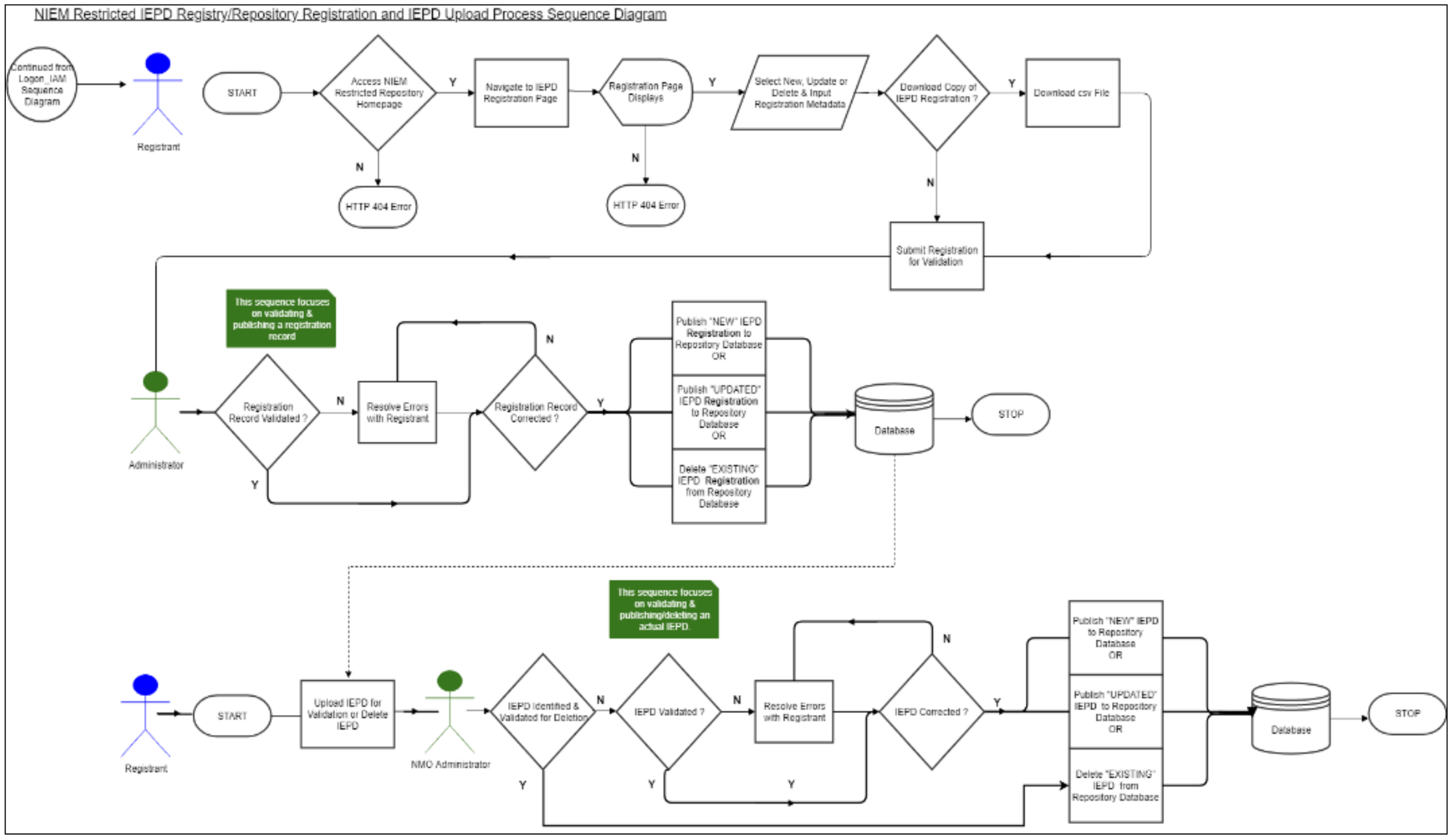

Figure 17: NIEM Restricted IEPD Registry/Repository Registration & IEPD Upload Process

3.10.2. UC 9: Input Metadata Parameters to Register an IEPD to the NIEM Restricted IEPD Registry/Repository

3.10.2.1. Purpose

- Enter metadata parameters to register/update an IEPD registration in the Restricted Registry/Repository.

3.10.2.2. Actors

- Registrant
  - New Registrant
  - Update Registrant - Registrant that updates an existing record (adds or deletes content to a previous registration) or deletes an entire previously registered IEPD.

3.10.2.3. Pre-conditions

- The Registrant has accessed the Restricted Registry/Repository Homepage.
- The Registrant has navigated to the Restricted Registry/Repository IEPD Registration Page.
- The IEPD Registration Page is displayed.
- The Registrant has selected New IEPD or Update IEPD or Delete IEPD Registration button.
- The IEPD Registration Page indicates New IEPD or Update or Delete registration.

The following Registration Metadata Fields are displayed (Figure 18.):

NIEM Restricted IEPD Registry/Repository Registration Metadata				
IEPD Registration Metadata Field Categories	**Mandatory Field Entry (M)** **Optional Field Entry (O)**	**Registrant may hide the following fields from the User for privacy reasons**  **Note - all data is available to NMO Administrator and DHS Engineer.**	**Parameter(s)**	**Notes/Specifications**
IEPD Title	**M**		Text	Maximum 500 characters. IEPD Title must be entered for valid submission otherwise error message returned when submitted.
Date submitted	-	-	Text	System Autofill

NIEM Domain	**M**		Drop-down Menu	The following Domain parameters are selectable as input: Agriculture, Biometrics, Cyber, Emergency Management, Immigration, Human Services, MilOps, Justice, Surface Transportation, CBRN, Intelligence, International Trade, Infrastructure Protection, Screening, Other.
Registering Organization/Agency/Entity	**M**		Text	Maximum 50 characters.
NIEM Version #	**M**		Drop-down Menu	The following NIEM Version #s are selectable as input: 1.0, 1.1, 1.2, 2.0, 2.1, 2.2, 3.0, 3.1, 3.2, 4.0, 4.1, 4.2,
NIEM Version # Rationale	**O**		Text	Maximum 500 characters.
IEPD Version #	**M**		Text	Maximum 4 characters. (Number Format X.X -XXX.X), Range 1.00-100.9
IEPD Version# Description	**O**		Text	This metadata field describes where in the lifecycle of the IEPD this registration resides. It is divided between a set of check-boxes and a free text area. **IEPD Status:** • • Planned • Under Development • In Production • IOC • Final • Update • Historical • Under Revision • Other A free text area (500 characters) is available to more thoroughly describe where in the lifecycle the IEPD resides.
NIEM Conformance	**O**		Yes/No	Self-assessment of conformance. Radio buttons.
Primary Point-of-Contact (POC)	**M/O**		Text	Form Fill. Full Name (Last Name, First Name, MI) **[Mandatory]**, Primary Phone Number, Secondary Phone Number, Primary Email **[Mandatory]**, Secondary Email, Organization.
Secondary Point Of Contact (POC)	**O**		Text	Form Fill. Full Name (Last Name, First Name, MI), Primary Phone Number, Secondary Phone Number, Primary Email, Secondary Email, Organization.
IEPD URL (Restricted Repository Equity)	**M***		URL	Maximum 100 characters. Valid URL to where IEPD stored. Either an IEPD URL or IEPD Description is mandatory.

IEPD Description	**M***		Text	Maximum 2000 characters. Either an IEPD URL or IEPD Description is mandatory.
IEPD URI/URL (External to Restricted Repository)[1]	**O**		URI/URL	Not a Restricted Repository Equity and points to external source outside the repository. Maximum 100 characters.
Keywords/TAGS	**O**		Text	Form Fill of 20 TAGS/Keywords. Maximum 50 characters per entry.
IEPD Artifacts	**O**		Checklist & Text	This meatdata field describes the required and optional artifacts associated with the IEPD. It is divided between a set of check-boxes and a free text area. **IEPD Artifact Checklist:** [29] • • NIEM Schema Subset **[required]** • Constraint schema • Extension Schema • Reference Schema **[required]** • mpd-catalog (IEPD unique identification, Conformance targets, basic info about IEPD, Key artifacts and directory structure, Relationship to other MODs and their artifacts) **[required]** • changelog **[required]** • readme **[required]** • iep sample **[required]** • code lists • conformance assertion • xml-catalog • wantlist • • **Other IEPD Lifecycle Artifacts - Scenario Planning** • Business Process Diagrams • Use Case Diagrams

				• Sequence Diagrams **- Analyze Requirements** • Business Rules • Business Requirements **- Map & Model** • Exchange Content Model • Mapping Document A free text area (500 characters) is available to list additional artifacts.
Other Supporting Documentation	O		Text URI/URL	Form Fill, Maximum 10 entries, Title and URI/URL.

The registration template also includes a 2000 character text field not discoverable by the User that is available for communicating with the Administrator to facilitate validation of the registration record. This field is of particular importance for update and delete actions to assist with resolving any ambiguity about the record to be changed or deleted.

1. This entry applies to an IEPD registered with the Restricted Repository but the IEPD is not stored in the Restricted Repository. If available, it points to an alternative source to acquire the IEPD.

Figure 18: Table Listing NIEM Restricted IEPD Registry/ Repository Registration Metadata

3.10.2.4. Post conditions

- The completed IEPD Registration Page is displayed.

3.10.2.5. Main Flow

- The Registrant selects New, Update or Delete IEPD registration.
- The Registrant inputs the appropriate metadata parameters:
  - **New Registration**
    - The Registrant completes the mandatory IEPD metadata registration fields.
    - The Registrant completes the optional IEPD metadata fields as appropriate/desired.
    - The Registrant selects those fields available to be hidden from the User (Search Customer).
    - The Registrant self-validates/reviews all metadata entries.
  - **Update Registration**
    - The Registrant enters the (Exact) IEPD Title, submission date and IEPD version # for the registration record to be changed.
    - The Registrant completes the mandatory IEPD metadata registration fields entering updates as appropriate.
    - The Registrant completes the optional IEPD metadata fields entering updates as appropriate.
    - The Registrant selects those fields available to be hidden from the User (Search Customer).
    - The Registrant self-validates/reviews all metadata entries.
    - NOTE- once validated, the updated record will replace the the original record.
  - **Delete Registration**

- The Registrant enters the (Exact) IEPD Title and IEPD version # for the registration record to be deleted.
- The Registrant self-validates/reviews all metadata entries.

3.10.2.6. Exceptions

- None.

3.10.3. UC 10: Download Registration

3.10.3.1. Purpose

- The Registrant downloads the current session (New, Update or Delete Registration record) to a device as a csv file.

3.10.3.2. Actors

- Registrant
  - New Registrant
  - Update Registrant - Registrant that updates an existing record (adds or deletes content to a previous registration) or deletes an entire previously registered IEPD.

3.10.3.3. Pre-conditions

- The current session/registration is complete and available for download.

3.10.3.4. Post conditions

- The input parameters from the Registrant's current session are downloaded to the Registrant's device as a csv file.

3.10.3.5. Main Flow

- Registrant downloads current session/registration as csv file.

3.10.3.6. Exceptions

- Download fails.

3.10.4. UC 11: Submit Registration for Validation

3.10.4.1. Purpose

- The Registrant submits the IEPD registration (New, Update, or Deletion) metadata to the Administrator for validation.

3.10.4.2. Actors

- Registrant

    - New Registrant
    - Update Registrant - Registrant that updates an existing record (adds or deletes content to a previous registration) or deletes an entire previously registered IEPD.
- NMO Administrator

3.10.4.3. Pre-conditions

- The current registration session is available for submission to the Administrator for validation.

3.10.4.4. Post conditions

- The Registrant's current session Registration is submitted to the Administrator for validation.

3.10.4.5. Main Flow

- The Registrant submits current session Registration.
- A message appears - "Successful Submission".

3.10.4.6. Exceptions

- The submission fails and an error message appears - "Submission Failure".

3.10.5. UC 12: Validate Registration

3.10.5.1. Purpose

- The Administrator validates an IEPD Registration.

3.10.5.2. Actors

- Administrator

3.10.5.3. Pre-conditions

- Registrant's IEPD registration metadata (New, Update or Delete) is submitted and available to the Administrator for review.
- A Standard Operating Procedure (SOP) for validating registrations and IEPDs is specified as a non-functional requirement for the registries and repositories under consideration. As a prerequisite of the validation process, it is available to the Administrator for validation guidance of registrations and IEPD artifacts presented for inclusion in the registry/repository. In both cases, validation requires manual intervention by the Administrator or a group of designated "experts" to vette registrations and IEPDs. The process is envisioned to include several focus areas:
    - Formal Validation_-Does the IEPD and registration conform to NIEM norms and to registry/repository minimum mandatory requirements?
    - Domain Appraisal - Does the IEPD have a favorable Domain endorsement?
    - User Evaluation – Is the User community consensus that the IEPD is useful for re-use?
    - NIEM Appraisal – for IEPDs supporting the same class of exchanges, does the IEPD under review represent the best instance to be recommended and promoted as the NIEM standard for the class. Likewise, should other similar IEPDs/ versions and the associated registrations be deprecated/demoted in comparisons to the chosen standard for the class?

- Formal Validation and Domain Appraisal are primary checks before registrations or IEPDs are posted to the restricted registry/repository. User Evaluations and NIEM Appraisals are more deliberative and rely on cooperating Users.
- The delineation of specific business rules governing the vetting process is beyond the scope of this document, but is acknowledged as an essential non-functional requirement to codify the validation process.

3.10.5.4. Post conditions

- A valid IEPD New registration is ready for publishing to the restricted registry/repository.
- A valid IEPD Update registration is ready for publishing to the restricted registry/repository.
- A valid request for deletion of a registration record currently in the restricted registry/repository is ready for processing.

3.10.5.5. Main Flow

- The Administrator reviews the registration for completeness and accuracy using a SOP.
- The Administrator conducts liaison with the Registrant and corrects any errors or inconsistencies with the registration metadata.
- The validated registration is ready for publishing to the repository or a deletion request is ready for processing.

3.10.5.6. Exceptions

- The Administrator cannot contact the Registrant for correction and cannot validate and publish or delete a registration.

3.10.6. UC 13: Publish Registration or Delete Former Record

3.10.6.1. Purpose

- The Administrator publishes a validated IEPD registration to the restricted registry/repository.

3.10.6.2. Actors

- Administrator

3.10.6.3. Pre-conditions

- A validated IEPD registration or deletion is ready for publication/deletion.

3.10.6.4. Post conditions

- A validated IEPD registration is published to the repository and available for search and discovery.
- A former stale or incorrect record is deleted from the restricted repository.

3.10.6.5. Main Flow

- The Administrator publishes an IEPD registration to the restricted registry or deletes a former registration record.

3.10.6.6. Exceptions

- The registration does not post to the restricted registry and an error message displays - "Publication Failure".

3.10.7. UC 14: Delete Former IEPD

3.10.7.1. Purpose

- Delete a stale IEPD (and associated registration) identified for deletion during registration process.

3.10.7.2. Actors

- Administrator

3.10.7.3. Pre-conditions

- Registrant has submitted deletion for validation.
- Deletion validated by Administrator.

3.10.7.4. Post conditions

- IEPD deleted

3.10.7.5. Main Flow

- The Administrator deletes the IEPD from the Restricted Repository.

3.10.7.6. Exceptions

- None.

3.10.8. UC 15 Upload IEPD/Updated IEPD for Validation

3.10.8.1. Purpose

- The Registrant Uploads the IEPD/Updated IEPD to temporary storage for validation.

3.10.8.2. Actors

- Registrant

3.10.8.3. Pre-conditions

- Registrant has submitted IEPD/Updated IEPD registration for validation.

3.10.8.4. Post conditions

- A valid IEPD/Updated IEPD is ready for publishing to the Restricted Repository.

3.10.8.5. Main Flow

- The Registrant uploads an IEPD/Updated IEPD for validation.

3.10.8.6. Exceptions

- None.

3.10.9. UC 16: Validate IEPD/Updated IEPD

3.10.9.1. Purpose

- The System Administrator validates an IEPD submission.

- A Standard Operating Procedure (SOP) for validating registrations and IEPDs is specified as a non-functional requirement for the registries and repositories under consideration. As a prerequisite of the validation process, it is available to the Administrator for validation guidance of registrations and IEPD artifacts presented for inclusion in the registry/repository. In both cases, validation requires manual intervention by the Administrator or a group of designated "experts" to vette registrations and IEPDs. The process is envisioned to include several focus areas:

    - Formal Validation_-Does the IEPD and registration conform to NIEM norms and to registry/repository minimum mandatory requirements?
    - Domain Appraisal - Does the IEPD have a favorable Domain endorsement?
    - User Evaluation – Is the User community consensus that the IEPD is useful for re-use?
    - NIEM Appraisal – for IEPDs supporting the same class of exchanges, does the IEPD under review represent the best instance to be recommended and promoted as the NIEM standard for the class. Likewise, should other similar IEPDs/ versions and the associated registrations be deprecated/demoted in comparisons to the chosen standard for the class?

- Formal Validation and Domain Appraisal are primary checks before registrations or IEPDs are posted to the registry/repository. User Evaluations and NIEM Appraisals are more deliberative and rely on cooperating Users.
- Although the delineation of specific business rules governing the vetting process is beyond the scope of this document, the NMO Administrator should consider engaging with the original IEPD registrant (if different from the current registrant) when an IEPD is being updated or deleted.

3.10.9.2. Actors

- Administrator

3.10.9.3. Pre-conditions

- Registrant's IEPD is submitted and available to the Administrator for review.

3.10.9.4. Post conditions

- A valid IEPD is ready for publishing.

3.10.9.5. Main Flow

- The Administrator reviews the IEPD for completeness and accuracy using SOP.
- The Administrator conducts liaison with the Registrant and corrects any simple errors or inconsistencies with the IEPD or has the Registrant submit a corrected IEPD.
- The validated IEPD is ready for publishing to the restricted repository.

3.10.9.6. Exceptions

- The Administrator cannot contact the Registrant for correction and cannot validate and publish the IEPD.

3.10.10. UC 17: Publish IEPD/Updated IEPD

3.10.10.1. Purpose

- The Administrator publishes a validated IEPD to the Restricted Repository.

3.10.10.2. Actors

- Administrator

3.10.10.3. Pre-conditions

- A validated IEPD is ready for publication.

3.10.10.4. Post conditions

- A validated IEPD is published to the Restricted Repository and is available for search, discovery and download.

3.10.10.5. Main Flow

- The Administrator publishes a IEPD to the Restricted Repository.

3.10.10.6. Exceptions

- Registration fails to post and an error message is generated.

3.11. Access Help

3.11.1. UC 18: Access Help Page

3.11.1.1. Purpose

- The Help Page provides detailed explanations of how to use the Restricted Repository. It includes directions on how to conduct a repository search, download an IPED, register a new IEPD, update/delete an existing registration record and/or upload a new IEPD or update/delete an existing IEPD to the repository. These explanations and directions are more comprehensive and in addition to tool tips which provide information about an item being hovered over such as an icon, image, hyperlink, or other element. The Contact Us link/icon is accessible within the Help Page or from the Menu Bar. The Contact Us Page provides the User (Search Customer) or Registrant the opportunity to discuss

issues encountered when using the repository, report error messages, request additional help or pose questions to the Administrator.

3.11.1.2. Actors

- IEPD Registrant
- New Registrant - registers and uploads an IEPD.
- Update Registrant - updates or deletes an existing record (adds, changes or deletes content to a previous registration record or deletes a previous registration in its entirety) or updates or deletes an IEPD.

3.11.1.3. Pre-conditions

- A Help link/icon appears on the menu bar of all registry webpages.

3.11.1.4. Post conditions

- The Help Page is displayed.

3.11.1.5. Main Flow

- The User or IEPD Registrant clicks the Help link/icon and is directed to the Help Page.
- The User or IEPD Registrant may access the Contact Us link within the Help Page or from the Menu Bar.
- The User or IEPD Registrant closes out the Help Page and returns to Search or Registration

3.11.1.6. Exceptions

- The Help Page cannot be accessed and a HTTP 404 error message is returned.

3.12. Alert Notification

3.12.1. UC 19: Alert

3.12.1.1. Purpose

- The system auto-notifies a Registrant and the system Administrator that a registration and/or IEPD needs to be reviewed to insure currency.

    - 3.12.1.2. Actors
    - System
    - Administrator
    - Registrant

3.12.1.3. Pre-conditions

- Staleness threshold set by Administrator.

3.12.1.4. Post conditions

- System sends alert to Registrant and system Administrator when threshold exceeded.

3.12.1.5. Main Flow

- The system tracks IEPD registration dates and IEPD upload dates and sends an alert to Registrant and system Administrator when a preset staleness threshold is exceeded.

3.12.1.6. Exceptions

- The Registrant email address is unavailable to the system and the NMO receives an error message.
- The Registrant's email is invalid and the NMO receives an error message.

3.13. Analytics

3.13.1. UC 20: Export Usage and Demographic Data

3.13.1.1. Purpose

- Maintain and administer the infrastructure, system, operations, software, and bug fixes associated with the Restricted Repository.

3.13.1.2. Actors

- System
- Administrator

3.13.1.3. Pre-conditions

- The system collects and stores User and Registrant usage and demographic data linked to profiles.

3.13.1.4. Post conditions

- User and Registrant usage and demographic data is exported.

3.13.1.5. Main Flow

- The system collects User and Registrant usage and demographic data linked to User and Registrant profiles and activities.
- The Administrator exports the data for subsequent analysis and display.

3.13.1.6. Exceptions

- None.

3.14. System Maintenance

3.14.1. UC 21: Maintain and Administer Registry

3.14.1.1. Purpose

- Maintain and administer the infrastructure, system, operations, software and bug fixes associated with the Restricted Repository.

3.14.1.2. Actors

- Engineer
- Administrator

3.14.1.3. Pre-conditions

- System operation must comply with host standards, policy and rules.

3.14.1.4. Post conditions

- Repository system operational on host platform.

3.14.1.5. Main Flow

- Conduct housekeeping, maintenance and bug fixing tasks to keep the system in compliance with host standards, policy and rules and enable the operation of a Restricted Repository.

3.14.1.6. Exceptions

- None.

3.15. Non-Functional Requirements

R Category	Non-Functional Requirements
Audit	• The system should incorporate an audit capability so all create, read, update, and delete actions are stored in an audit database. • Data should be hidden from view until a suitable time frame passes and then it can be deleted
Accessibility	• The system shall be functional on all industry-standard browsers including Microsoft Edge, Mozilla Firefox, and Google Chrome. • The system must be available on the Internet. • The system must be usable by mobile devices.
Availability	• The system should be operational no less than 99% of the time. • Maintenance procedures should be delivered as part of the system documentation. • The system shall include Restore and reactivate procedures should be delivered as part of the system documentation.

Backup and Restore	• The primary system administrator, or designated alternative administrator, should be responsible for all backup and restore operations • The storage medium should be as appropriate for sponsor guidelines. • A full backup should be completed weekly with a daily incremental backup performed between the weekly backups. • Backup data should be retained in accordance with Sponsor, directives, and guidelines.
Capacity	• The memory and storage requirements should be part of the system documentation listed as minimum system requirements
Certification and Compliance	• The system shall comply with Federal regulations and sponsor standards, policy and rules. See section 1.5 References and Section 2.1 Assumptions. • The system shall comply with IT Accessibility Laws and Policies ADA Section 508[7].

Documentation	• The documentation should comply with Federal and Sponsor directives, and guidelines.
	• The system shall include standard system documentation including, but not limited to:
	  •
	  • User Guides
	  • Online Help capability
	  • Source Code
	  • Data Model
	  • Technical Manuals
	• A Standard Operating Procedure (SOP) for validating registrations and IEPDs is specified as a non-functional requirement for the registries and repositories under consideration. As a prerequisite of the validation process, it is available to the Administrator for validation guidance of registrations and IEPD artifacts presented for inclusion in the registry/repository. In both cases, validation requires manual intervention by the Administrator or a group of designated "experts" to vette registrations and IEPDs. The process is envisioned to include several focus areas:
	  • Formal Validation_-Does the IEPD and registration conform to NIEM norms and to registry/repository minimum mandatory requirements?
	  • Domain Appraisal - Does the IEPD have a favorable Domain endorsement?
	  • User Evaluation – Is the User community consensus that the IEPD is useful for re-use?
	  • NIEM Appraisal – for IEPDs supporting the same class of exchanges, does the IEPD under review represent the best instance to be recommended and promoted as the NIEM standard for the class. Likewise, should other similar IEPDs/ versions and the associated registrations be deprecated/demoted in comparisons to the chosen standard for the class?

	Formal Validation and Domain Appraisal are primary checks before registrations or IEPDs are posted to the registry/repository. User Evaluations and NIEM Appraisals are more deliberative and rely on cooperating Users. The delineation of specific business rules governing the vetting process is beyond the scope of this document, but is acknowledged as an essential non-functional requirement to codify the validation process. • User Survey documentation- The system is configured to send an email to the User subsequent to his experience interacting with the repository. After a predefined period, the system sends an email query to the User to solicit a response to a series of questions. The objective of this survey is twofold. First, a series of Likert scale questions examine the User's overall impression of using the registry. Second, predicated on the User retrieving IEPDs after his IEPD search, a series of questions asks the User to score the re-use value of the IEPDs retrieved. The survey also includes a text box where the User can add additional comments. The survey is returned via email to the Administrator. The details of the survey are beyond the scope of this document, but captured as a non-functional requirement.
Efficiency	• The system should notify the user of an error with information describing the error in a non-technical manner, for example, if a text box requires dates in a specific format the user should be notified where the text box exists and what format the date should be in. • The system should record all errors and store them in a database for future analysis.
Interoperability	• All time stamps should be in coordinated universal time (UTC) or Zulu time.
Maintainability	• Maintainability procedures should be delivered as part of the system documentation.
Modifiability	• IAW Federal and Sponsor, regulations and guidelines. • The system shall incorporate free open-source development framework and libraries where possible. • The system shall allow localization of language variables in case developers would like to translate for external use. • The system shall be designed to support the English-speaking user in the United States (en_US.UTF-8 locale).
Privacy	• IAW Federal and Sponsor guidelines
Procedures	• IAW this SRS, Federal, and Sponsor guidelines.

Redundancy	• IAW Federal and Sponsor guidelines.
Resource Management	• The GUI, tool tips and Help Pages should be sufficient for the User and/or Registrant to interact successfully with the repository without formal training. *You Tube* videos demonstrating key system capabilities would be useful with link to the repository Help Pages.
Security (RFM)	• Provide documentation that shows how the RMF requirements have been addressed.
Performance	TBD
Portability	The system should be portable. So moving from one OS to other OS does not create any problem.

Figure 19: Table Listing NIEM Restricted IEPD Registry/ Repository Non-Functional Requirements.

4. NIEM Public Repository

In Section 2 we addressed requirements associated with the NIEM Public Registry. This section looks at a NIEM Public Repository as an adjunct to a registry. The subsequent NIEM Public Repository discussion leverages the work done in Section 2 (NIEM Public Registry), but focuses on those functions and behaviors unique to a repository (See Figure 20: NIEM Public Repository). Those unique functions and behaviors (shaded in red on Figure 20.) include:

- User download of IEPDs from the NIEM Public Repository
- Deletion of IEPDs previously registered and stored in the NIEM Public Repository.
- Registrant upload of IEPDs for validation.
- Validation of IEPDs.
- Publication of validated IEPDs to the repository.

Our discussion of the NIEM Public Repository is predicated on anonymous users and the absence of managed accounts similar to the NIEM Public Registry, but diverges in that no assumption of a DHS host or Drupal 8 back-end is assumed. Consequently, when a host and operating system is identified our assumptions, constraints and limitations/risks will need to be adjusted. As in the case of the NIEM Restricted Repository (Section 3), a validated registration may point to an IEPD location outside of the NIEM Public Repository.

4.1. Assumptions

- The NIEM Public Repository assumes the existence of a supporting registry such as the NIEM Public Registry.
- The NIEM Public Repository requirements assume a Federal sponsor. If no Federal governance is imposed, these requirements will need to be reviewed to delete Federal requirements/constraints, standards, policy, rules, regulations and guidelines.

- The NIEM Public Repository requirements are agnostic to those standards, policies, and rules specific to a particular Federal sponsor, department or agency.
- The NIEM Public Repository requirements are agnostic to a specific host platform or back-end content framework.
- If the NIEM Public Registry is the front-end to the NIEM Public Repository then the constraints associated with the DHS, Drupal 8 implementation will have to be included as appropriate to Section 4.2, Constraints.
- These requirements are not resource constrained except as explicitly defined in Section 4.2 Constraints.
- Anonymous users/registrants are able to access the repository and delete, upload and download IEPDs.
- The system will support tool tips.
- The system will include a help page in addition to tool tips.
- At Initial Operating Capability (IOC), the NIEM Public Repository will not be fully populated with known IEPDs. The NMO will advertise the NEIM Public Repository through a STRATCOM communications campaign and work with the NBAC and the NIEM Community of Interest (COI) at large to encourage IEPD registration and upload to the repository. In addition, the NMO Administrator will work in the background to validate and transition known IEPDs into the repository. As resources permit, some historical IEPDs may be loaded into the repository prior to IOC.
- The DoDCIO, among others, has identified a need to capture NIEM usage data including the demographics of enduring clients/Domains as well as potential new NIEM adopters. The RTT has agreed to decouple this requirement from the NIEM Public Repository scope. As such, usage and demographic data will be collected separately.

4.2. Constraints

- Compliance with Federal standards, policy and rules place constraints on the scope, functions and implementation of the NIEM Public Repository.
- Managed accounts are not envisioned as a requirement of the repository or supporting registry (no user logon controls, user identity management, user access controls or user profiles).
- The system shall be hosted in a secure environment.
- The system shall be accessible via http protocol.
- The following documents and conformance constraints among others pertain: [1-8, 20-23]

    - Executive Order 13556 "Controlled Unclassified Information".
    - 32 CFR Part 2002, "Controlled Unclassified Information".
    - Federal Information Processing Standards Publication 199, "Standards for Security Categorization of Federal Information and Information Systems".
    - Federal Information Processing Standards Publication 200, "Minimum Security Requirements for Federal Information and Information Systems".
    - NIST Special Publication 800-53, Revision 4, "Security and Privacy Controls for Federal Information Systems and Organizations".
    - NIST Special Publication 800-88, Revision 1, "Guidelines for Media Sanitization,"
    - NIST Special Publication 800-171, Revision 1, "Protecting Controlled Unclassified Information in Non-federal Systems and Organizations."
    - NIST Special Publication 800-171A, "Assessing Security Requirements for Controlled Unclassified Information.
    - Section 1535 of Title 31, United States Code (Economy Act).
    - United States Web Design Standards (USWDS).
    - ADA Section 508.
    - 21st Century IDEA Act.

4.3. Limitations/Risks

- A persistent issue identified as a principal reason previous registry/repository attempts have failed is that without some self/auto-populating feature, the task of registering IEPDs eventually becomes so onerous for the community that members decline to register new IEPDs or updates. Subsequently, the registry/repository becomes stale over time.

- Although the repository assumes the existence of a NIEM Public Registry as described in Section 2, DHS does not currently support a repository for mass storage integrated with Drupal 8.

4.4. Scope

The NIEM Public Repository is envisioned as a web-service where IEPDs are registered and stored to enable discovery and IEPD re-use.

Managed accounts and collection of user profile information is beyond the scope of this project. A listing of pertinent assumptions, constraints and limitations/risks defining system boundaries is found in Sections 4.1 – 4.3. The functional requirements are subsequently specified in terms of use cases (Section 4.6) and use case descriptions (Sections 4.7.1 – 4.11.6). Non-Functional requirements of the system are listed in Section 4.12, Figure 23.

The subsequent discussion focuses on repository functions and behaviors and assumes a registry similar to that outlined in Section 2 (NIEM Public Registry) already exists and will be integrated with the repository herein described.

4.5. Functional Requirements

The functional requirements for the NIEM Public Registry project are delineated in Sections 4.7 - 4.11. The use case methodology is employed to devolve requirements. Use cases typically have two main components: use case diagrams (Section 4.6), which graphically describe actors and their use cases, and the text of the use case itself (Sections 4.7-4.11).

4.6. Use Case Diagram - NIEM Public IEPD Repository

The NIEM Public IEPD Registry/Repository Use Case Diagram depicted below (Figure 2.) includes five primary actors: the User, Registrant, NMO Administrator, engineer, and system. The new use cases introduced with the addition of a repository are highlighted in red.

4.7. Download IEPD

This use case occurs at the end of the registry search sequence (Figure 21). It presumes that the User has accessed the registry/repository homepage and navigated to the search page and conducted a search. After the User has conducted his search and discovered an IEPD (s) for inspection and possible re-use, the User downloads the IEPD (s) from the NIEM Public Repository (highlighted in red) or is pointed to another source outside the system to retrieve the IEPD (s).

NIEM Public Repository (with registry use cases included for continuity)

This Use Case Diagram updates the NIEM Public Registry Use Case Diagram (Figure 2), adding the the unique functions and behaviors (shaded in red) associated with including the NIEM Public Repository:

- Download IEPD
- Delete Registration & IEPD
- Upload IEPD for Validation
- Validate Upload
- Publish to Repository

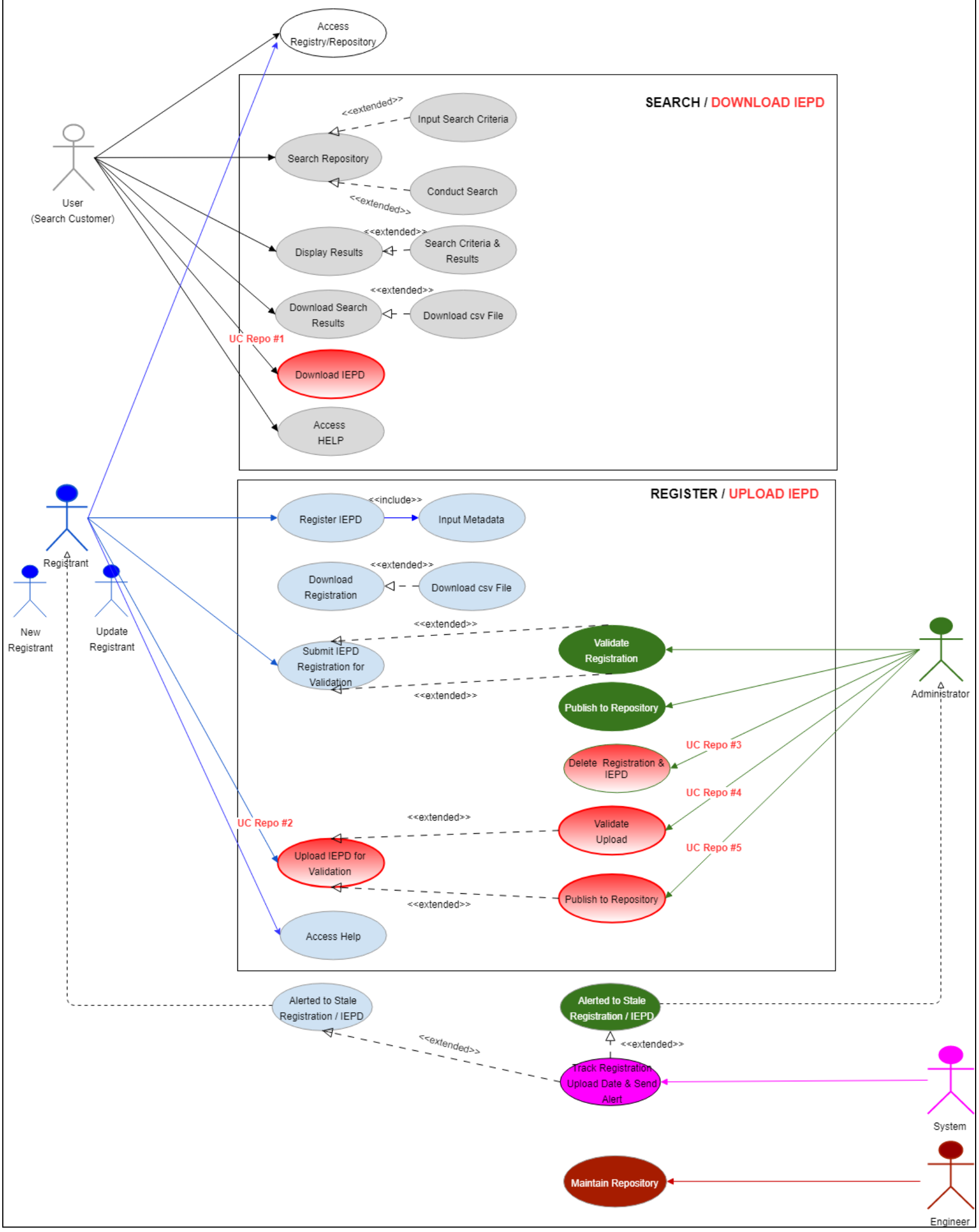

Figure 20: NIEM Public Repository (includes registry function & behaviors for continuity).

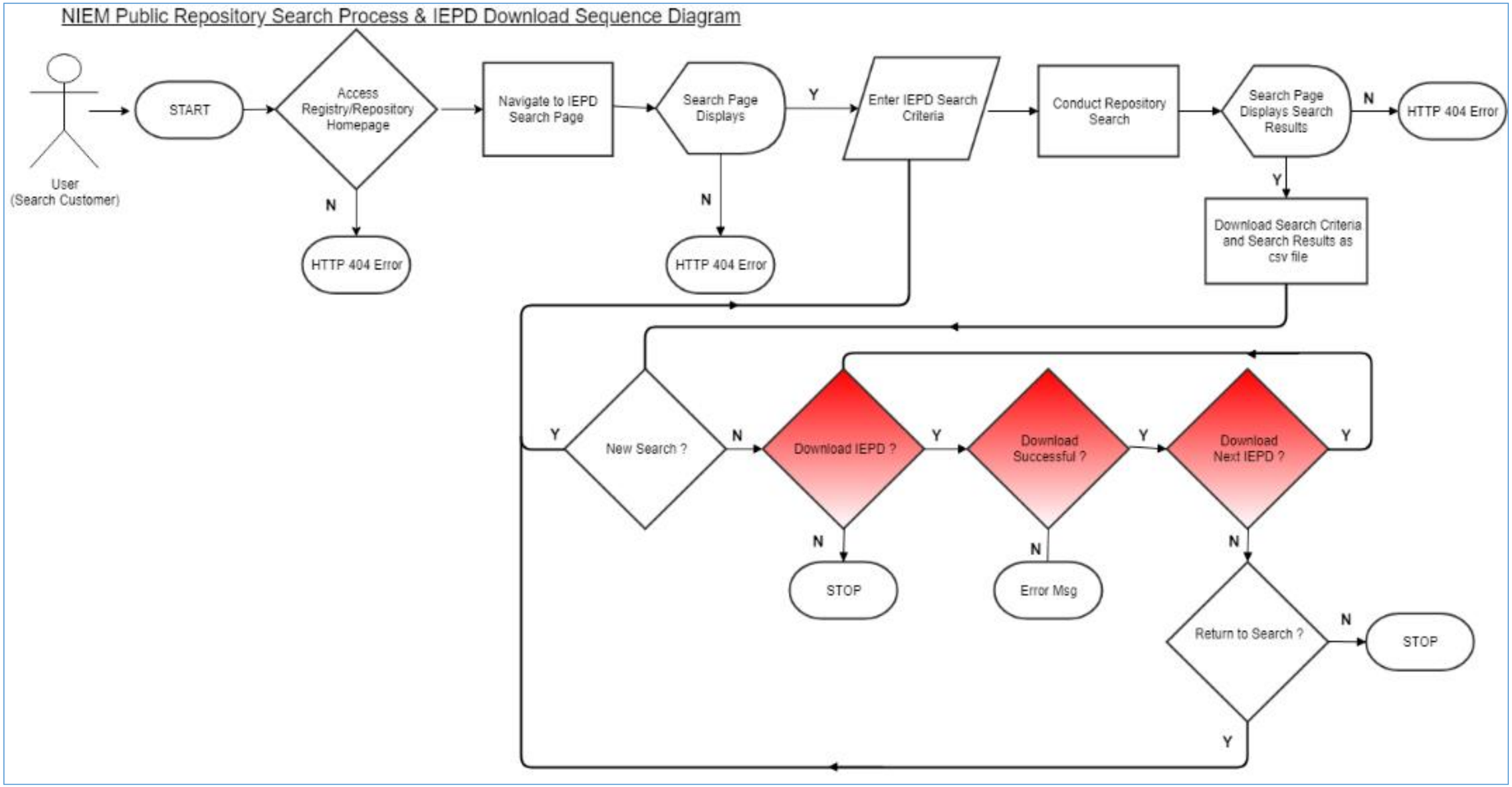

Figure 21: NIEM Restricted Repository Search Process and IEPD Download Sequence Diagram.

4.7.1. UC Repo #1: Download IEPD

4.7.1.1. Purpose

- The User (Search Customer) downloads an IEPD from the NIEM Public Repository or is directed to a location outside the repository to retrieve the IEPD.

4.7.1.2. Actors

- User (Search Customer)

4.7.1.3. Pre-conditions

- The User's (Search Customer's) search identifies a URL within the repository to download an IEPD.
- The User's (Search Customer's) search identifies a URL pointing outside the repository boundary to download an IEPD.
- The User's (Search Customer's) search identifies a POC that can facilitate sourcing an IEPD.

4.7.1.4. Post conditions

- The User's downloads an IEPD from the repository.
- The User is directed outside the repository boundary to source an IEPD.

4.7.1.5. Main Flow (Figure 21, red highlights).

- The User (Search Customer) downloads an IEPD from the repository.
- The User (Search Customer) leaves the repository to source an IEPD.

4.7.1.6. Exceptions

- Repository download fails.

4.8. Delete Registration and IEPD

NIEM Public Repository Registration and IEPD Upload/Delete Process Sequence Diagram

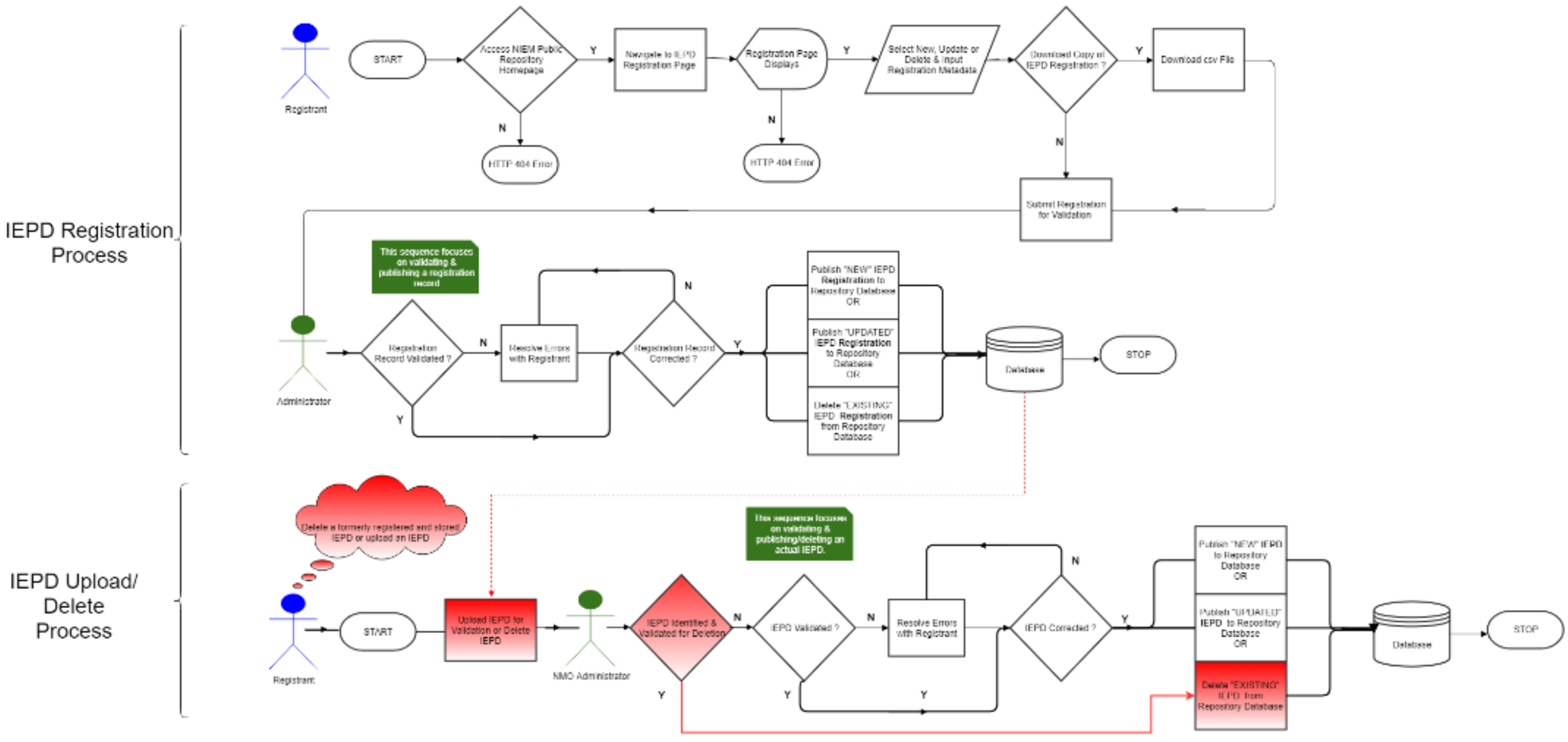

Figure 22: NIEM Public Repository Registration and IEPD Upload /Delete Process Sequence Diagram

4.8.1. UC Repo #2: Delete Former IEPD

4.8.1.1. Purpose

- Delete a stale IEPD (and associated registration) identified for deletion during registration process.

4.8.1.2. Actors

- Administrator

4.8.1.3. Pre-conditions

- Registrant has submitted deletion for validation.
- Deletion validated by Administrator.

4.8.1.4. Post conditions

- IEPD deleted

4.8.1.5. Main Flow (Figure 22, red highlights)

- The Administrator deletes the IEPD from the NIEM Public Repository.

4.8.1.6. Exceptions

- None.

4.9. Upload IEPD for Validation

4.9.1. UC Repo #3 Upload IEPD/Updated IEPD for Validation

4.9.1.1. Purpose

- The Registrant Uploads the IEPD/Updated IEPD to temporary storage for validation.

4.9.1.2. Actors

- Registrant

4.9.1.3. Pre-conditions

- Registrant has submitted IEPD/Updated IEPD registration for validation.

4.9.1.4. Post conditions

- A valid IEPD/Updated IEPD is ready for validation.

4.9.1.5. Main Flow (See Figure 22, red highlights)

- The Registrant uploads an IEPD/Updated IEPD for validation.

4.9.1.6. Exceptions

- None.

4.10. Validate Upload

4.10.1. UC Repo #4: Validate IEPD/Updated IEPD

4.10.1.1. Purpose

- The System Administrator validates an IEPD submission.

- A Standard Operating Procedure (SOP) for validating registrations and IEPDs is specified as a non-functional requirement for the registries and repositories under consideration. As a prerequisite of the validation process, it is available to the Administrator for validation guidance of registrations and IEPD artifacts presented for inclusion in the registry/repository. In both cases, validation requires manual intervention by the Administrator or a group of designated "experts" to vette registrations and IEPDs. The process is envisioned to include several focus areas:
    - Formal Validation_-Does the IEPD and registration conform to NIEM norms and to registry/repository minimum mandatory requirements?
    - Domain Appraisal - Does the IEPD have a favorable Domain endorsement?
    - User Evaluation – Is the User community consensus that the IEPD is useful for re-use?
    - NIEM Appraisal – for IEPDs supporting the same class of exchanges, does the IEPD under review represent the best instance to be recommended and promoted as the NIEM standard for the class. Likewise, should other similar IEPDs/ versions and the associated registrations be deprecated/demoted in comparisons to the chosen standard for the class?
- Formal Validation and Domain Appraisal are primary checks before registrations or IEPDs are posted to the registry/repository. User Evaluations and NIEM Appraisals are more deliberative and rely on cooperating Users.
- The delineation of specific business rules governing the vetting process is beyond the scope of this document, but is acknowledged as an essential non-functional requirement to codify the validation process.

4.10.1.2. Actors

- Administrator

4.10.1.3. Pre-conditions

- Registrant's IEPD is submitted and available to the Administrator for review.

4.10.1.4. Post conditions

- A valid IEPD is ready for publishing.

4.10.1.5. Main Flow (See Figure 22, red highlights)

- The Administrator reviews the IEPD for completeness and accuracy using SOP.
- The Administrator conducts liaison with the Registrant and corrects any simple errors or inconsistencies with the IEPD or has the Registrant submit a corrected IEPD.
- The validated IEPD is ready for publishing to the NIEM Public Repository.

4.10.1.6. Exceptions

- The Administrator cannot contact the Registrant for correction and cannot validate and publish the IEPD.

4.11. Publish to Repository

4.11.1. UC Repo #5: Publish IEPD/Updated IEPD

4.11.1.1. Purpose

- The Administrator publishes a validated IEPD to the NIEM Public Repository.

4.11.1.2. Actors

- Administrator

4.11.1.3. Pre-conditions

- A validated IEPD is ready for publication.

4.11.1.4. Post conditions

- A validated IEPD is published to the Restricted Repository and is available for search, discovery and download.

4.11.1.5. Main Flow (See Figure 22, red highlights)

- The Administrator publishes a IEPD to the Restricted Repository.

4.11.1.6. Exceptions

- Registration fails to post and an error message is generated.

4.12. Non-Functional Requirements

R Category	Requirements
Audit	• The system should incorporate an audit capability so all create, read, update, and delete actions are stored in an audit database.

	• Data should be hidden from view until a suitable time frame passes and then it can be deleted
Accessibility	• The system shall be functional on all industry-standard browsers including Microsoft Edge, Mozilla Firefox, and Google Chrome. • The system must be available on the Internet. • The system must be usable by mobile devices.
Availability	• The system should be operational no less than 99% of the time. • Maintenance procedures should be delivered as part of the system documentation. • The system shall include Restore and reactivate procedures should be delivered as part of the system documentation.
Backup and Restore	• The primary system administrator, or designated alternative administrator, should be responsible for all backup and restore operations • The storage medium should be as appropriate for sponsor guidelines. • A full backup should be completed weekly with a daily incremental backup performed between the weekly backups. • Backup data should be retained in accordance with Sponsor, directives, and guidelines.
Capacity	• The memory and storage requirements should be part of the system documentation listed as minimum system requirements
Certification and Compliance	• The system shall comply with Federal regulations and sponsor standards, policy and rules. See section 1.5 References and Section 2.1 Assumptions. • The system shall comply with IT Accessibility Laws and Policies ADA Section 508[7].

Documentation	• The documentation should comply with Federal and Sponsor directives, and guidelines.
	• The system shall include standard system documentation including, but not limited to:
	  • User Guides
	  • Online Help capability
	  • Source Code
	  • Data Model
	  • Technical Manuals
	• A Standard Operating Procedure (SOP) for validating registrations and IEPDs is specified as a non-functional requirement for the registries and repositories under consideration. As a prerequisite of the validation process, it is available to the Administrator for validation guidance of registrations and IEPD artifacts

	presented for inclusion in the registry/repository. In both cases, validation requires manual intervention by the Administrator or a group of designated "experts" to vette registrations and IEPDs. The process is envisioned to include several focus areas: • Formal Validation_-Does the IEPD and registration conform to NIEM norms and to registry/repository minimum mandatory requirements? • Domain Appraisal - Does the IEPD have a favorable Domain endorsement? • User Evaluation – Is the User community consensus that the IEPD is useful for re-use? • NIEM Appraisal – for IEPDs supporting the same class of exchanges, does the IEPD under review represent the best instance to be recommended and promoted as the NIEM standard for the class; likewise, should other similar IEPDs/ versions and the associated registrations be deprecated/demoted in comparisons to the chosen standard for the class. Formal Validation and Domain Appraisal are primary checks before registrations or IEPDs are posted to the registry/repository. User Evaluations and NIEM Appraisals are more deliberative and rely on cooperating Users. The delineation of specific business rules governing the vetting process is beyond the scope of this document, but is acknowledged as an essential non-functional requirement to codify the validation process. • User Survey documentation- The system is configured to send an email to the User subsequent to his experience interacting with the repository. After a predefined period, the system sends an email query to the User to solicit a response to a series of questions. The objective of this survey is twofold. First, a series of Likert scale questions examine the User's overall impression of using the registry. Second, predicated on the User retrieving IEPDs after his IEPD search, a series of questions asks the User to score the re-use value of the IEPDs retrieved. The survey also includes a text box where the User can add additional comments. The survey is returned via email to the Administrator. The details of the survey are beyond the scope of this document, but captured as a non-functional requirement.
Efficiency	• The system should notify the user of an error with information describing the error in a non-technical manner, for example, if a text box requires dates in a specific format the user should be notified where the text box exists and what format the date should be in. • The system should record all errors and store them in a database for future analysis.
Interoperability	• All time stamps should be in coordinated universal time (UTC) or Zulu time.
Maintainability	• Maintainability procedures should be delivered as part of the system documentation.
Modifiability	• IAW Federal and Sponsor, regulations and guidelines.

	• The system shall incorporate free open-source development framework and libraries where possible. • The system shall allow localization of language variables in case developers would like to translate for external use. • The system shall be designed to support the English-speaking user in the United States (en_US.UTF-8 locale).
Privacy	• IAW Federal and Sponsor guidelines
Procedures	• IAW this SRS, Federal, and Sponsor guidelines.
Redundancy	• IAW Federal and Sponsor guidelines.
Resource Management	• The GUI, tool tips and Help Pages should be sufficient for the User and/or Registrant to interact successfully with the repository without formal training. *You Tube* videos demonstrating key system capabilities would be useful with link to the repository Help Pages.
Security (RFM)	• Provide documentation that shows how the RMF requirements have been addressed.
Performance	TBD
Portability	The system should be portable. So moving from one OS to other OS does not create any problem.

Figure 23: NIEM Public Repository Non-Functional Requirements

5. APPENDIX: Glossary

Concept	Definition
Administrator	The Administrator is the actor who is responsible for the configuration and reliable operation of system.
changelog (NIEM Required IEPD Artifact)	An IEPD required artifact that describes the changes applied to the IEPD since its previous version.
code lists (NIEM IEPD Artifact)	Code List Artifacts (Code Lists) provide a method to specify categorical descriptors for data used within exchanges and IEPs. Code Lists in NIEM use one of two formats: Comma-Separated Values (CSV), or Genericode.
conformance-assertion (NIEM IEPD Artifact)	An IEPD optional artifact that provides a declaration that an IEPD conforms to relevant NIEM specifications and associated rules, including NIEM Conformance 3.0, NIEM Naming and Design Rules 4.0, NIEM Conformance Targets Attribute Specification 3.0, and NIEM MPD Specification 3.0.1.
constraint schema (NIEM IEPD Artifact)	An IEPD optional artifact, a set of related constraint schema documents that work together; for example, a constraint schema document set could be built by adding constraints to a schema document subset.
DHS Engineer	A Use Case Actor whose relationship with the system, NIEM Public Repository, is defined in terms of design, development, bug fixes and routine maintenance and housekeeping chores to insure continuity of operations. The DHS engineer is also the principal system administrator.
Drupal	Drupal is a free and open-source web content management framework written in PHP and distributed under the GNU General Public License. Drupal provides a back-end framework for at least 2.3% of all websites worldwide ranging from personal blogs to corporate, political, and government sites. Systems also use Drupal for knowledge management and for business collaboration. Link: https://www.drupal.org/
Engineer	The Engineer is the actor who is responsible for bug fixes and routine maintenance and housekeeping chores to insure continuity of operations.
<<exclude>>UML Use Case	The <<exclude>> relationship typically defines optional behavior that is not necessarily meaningful by itself. The extend relationship is owned by the extending use case. The same extending use case can extend more than one use case, and extending use case may itself be extended.[25]
extension schema (NIEM IEPD Artifact)	An IEPD artifact, NIEM-conformant properties and types to represent message data requirements that are not available in a NIEM release. Extensions schemas are used in combination with NIEM subset schemas to define the structure and meaning of a message. An extension schema document is a schema document that is intended to provide definitions of schema components that are intended for reuse within a more narrow scope than those defined by a reference schema document. An XML document with a conformance target identifier of http://reference.niem.gov/niem/specification/naming-and-design-rules/4.0/#ExtensionSchemaDocument MUST be an extension schema document.

Faceted Search	Faceted search is a technique which involves augmenting traditional search techniques with a faceted navigation system, allowing users to narrow down search results by applying multiple filters based on faceted classification of the items.[26]
Functional Requirement	A functional requirement (FR) captures the intended behavior of the system. This behavior may be expressed as services, tasks or functions the system is required to perform.
IEP	An Information Exchange Package (IEP) is an actual NIEM message exchanged between stakeholders. The format for this message is defined by the schemas and artifacts in its corresponding Information Exchange Package Documentation (IEPD).
IEPD	An Information Exchange Package Documentation (IEPD) is a collection of NIEM artifacts. They define and describe the context, content, semantics, and structure of one or more implementable information exchanges.
iep-sample (NIEM Required IEPD Artifact)	An IEPD required artifact, a sample xml instance that serves as a test for the IEPD schemas. The sample instance should contain realistic data and use as many data components and validity constraints as possible.
<<include>> UML Use Case	The «include» relationship allows us to include the steps from one Use Case into another. This is valuable when the included steps occur as a recognizable sequence.[27]
mpd-catalog (NIEM Required IEPD Artifact)	An IEPD required artifact, an unique identification, conformance targets, basic information about IEPD, key artifacts and directory structure, relationship to other MODs and their artifacts
subset schema (NIEM Required IEPD Artifact)	An IEPD required artifact, a subset schema is a customized version of a NIEM schema that contains only the properties, types, and codes that are needed for a particular information exchange, plus any of their required dependencies. The output from the SSGT from the Map and Model step. The IEPD needs to either contain that full set of release schemas or a subset of that release in order to provide the source of NIEM components.
Non Functional Requirement	A non-functional requirement (NFR) is a requirement that specifies criteria that can be used to judge the operation of a system, rather than specific behaviors. They are contrasted with functional requirements that define specific behavior or functions.
NMO Administrator	The NMO administrator is subordinate to the DHS Engineer for the NIEM Public Registry and performs delegated system administration functions.
Open-Source Software	Open-source software is a type of computer software in which source code is released under a license in which the copyright holder grants users the rights to study, change, and distribute the software to anyone and for any purpose. . Open-source software is often envisioned as enabling software development in a collaborative public manner.[30]
readme (NIEM Required IEPD Artifact)	An IEPD required informal documentation artifact that includes an initial description or instructional information. This artifact describes the IEPD purpose, scope, business value, exchange information, typical senders/receivers, interactions, and references to other documentation.
reference schema (NIEM Required IEPD Artifact)	An IEPD required artifact, - A reference schema document is a schema document that is intended to provide the authoritative definitions of broadly reusable schema components. An XML document with a conformance target identifier of http://reference.niem.gov/niem/specification/naming-and-design-

	rules/4.0/#ReferenceSchemaDocument MUST be a conformant reference schema document.
Registrant	A **Registrant** refers to a Use Case actor that interacts with a registry or repository, the system. The Registrant has two possible roles: • **New Registrant** - registering a new IEPD. In the case of interaction with a repository, the New Registrant also submits a new IEPD for validation and publishing to the repository. • **Update Registrant** - updating (changing, adding or deleting metadata) from a previous IEPD registration record or deleting an entire previous registration record. In the case of interaction with a repository, if the IEPD itself needs updating or removal from the repository, the Update Registrants submits the updated IEPD for validation and publishing to the repository or request removal of an existing IEPD from the repository.
Registry	A registry is a place, such as a web-service/web-presence, for people to register IEPDs to enable discovery and IEPD re-use.
Repository	A repository is a place, such as a web-service/web presence, for people to upload IEPDs to enable discovery, download, and re-use of IEPDs.
Search Customer	A Use case actor synonymous with User. A search customer searches a registry or repository to discover IEPDs.
SOP	The acronym SOP refers generally to Standard Operating Procedures, but also is used more specifically when describing the "validation" processes. A Standard Operating Procedure (SOP) for validating registrations and IEPDs is specified as a non-functional requirement for the registries and repositories under consideration. As a prerequisite of the validation process, it is available to the Administrator for validation guidance of registrations and IEPD artifacts presented for inclusion in the registry/repository. In both cases, validation requires manual intervention by the Administrator or a group of designated "experts" to vette registrations and IEPDs. The process is envisioned to include several focus areas: • • Formal Validation_-Does the IEPD and registration conform to NIEM norms and to registry/repository minimum mandatory requirements? • Domain Appraisal - Does the IEPD have a favorable Domain endorsement? • User Evaluation – Is the User community consensus that the IEPD is useful for re-use? • NIEM Appraisal – for IEPDs supporting the same class of exchanges, does the IEPD under review represent the best instance to be recommended and promoted as the NIEM standard for the class. Likewise, should other similar IEPDs/ versions and the associated registrations be deprecated/demoted in comparisons to the chosen standard for the class? Formal Validation and Domain Appraisal are primary checks before registrations or IEPDs are posted to the registry/repository. User Evaluations and NIEM Appraisals are more deliberative and rely on cooperating Users. The delineation of specific business rules governing the vetting process is beyond the scope of this document, but is acknowledged as an essential non-functional requirement to codify the validation process.

Tool Tip	A tooltip is a graphical user interface (GUI) element used in conjunction with the cursor or mouse pointer to display information about an item without needing to click on it. The typical scenario for summoning a tooltip is to hover the mouse cursor over another GUI element such as a tool icon in software application, and it is also prevalently used in websites.[26]
URI	A UR**I** is an **identifier** of a specific resource. Like a page, or book, or a document.
URL	A UR**L** is special type of identifier that also tells you **how to access it**, such as `HTTPs`, `FTP`, etc.
User	A **User** refers to a Use Case actor that interacts with a registry or repository, the system. The User is also referred to as the **Search Customer**. In the case of a registry search, the User searches for IEPD registrations which provide a path outside the system to retrieve an actual IEPD. In the case of a repository search, the User searches for IEPD registrations and then downloads the IEPD within the system directly or is pointed to a location outside the repository.
wantlist (NIEM IEPD Artifact)	An IEPD artifact, xml file that contains the elements and types from NIEM that will be included within the subset schema for the exchange. In other words, it describes what an exchange “wants” from the NIEM data model. Output from the SSGT during the Map and Model step.
xml-catalog (NIEM IEPD Artifact)	An IEPD artifact, xml instance that describes mappings between external schema references and locally-cached equivalents. A basic xml-catalog will be generated with the subset and can be modified as necessary.

6. APPENDIX: Acronyms

Acronym	Definition
CFR	Code of Federal Regulations
CUI	Controlled Unclassified Information
ESC	Executive Steering Council
DoDI	Department of Defense Instruction
DHS	Department of Homeland Security
DOJ	Department of Justice
EA	Executive Assistant
F2F	Face-to-Face
FR	Functional Requirement
GUI	Graphic User Interface
IAW	In Accordance With
IOC	Initial Operating Capability
MilOps	Military Operations
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
MPD	Model Package Description
NBAC	NIEM Business Architecture Committee
NFR	Non-Functional Requirement
NIEM	National Information Exchange Model
NISS	National Information Sharing Standards
NIST	National Institute of Standards and Technology
NMO	NIEM Management Office

NTAC	NIEM Technical Architecture Committee
POC	Point of Contact
R2TT	Registry/Repository Tiger Team
SELC	System Engineering Lifecycle
SOP	Standard Operating Procedures
SSGT	Schema subset generation tool
URI	Universal Resource Identifier
URL	Universal Resource Locator
USWDS	United States Web Design System