

FAA-STD-060, Rev. B
March 8, 2004



U.S Department
of Transportation

**Federal Aviation
Administration**

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**Federal Aviation Administration
Standard**

DATA STANDARD
FOR
THE NATIONAL AIRSPACE SYSTEM (NAS)

FAA-STD-060, Rev. B
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Foreword

This Standard sets forth the requirements for systems in the National Airspace System (NAS) that will interface and share data with other NAS systems. It provides the interchange format for representing commonly shared NAS data. This standard is intended for use by the Federal Aviation Administration (FAA), and by contractors to the FAA involved in the development of NAS systems.

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1.0 Introduction

Standardization is an enabling strategy, which can help developing organizations and system owners to achieve a common goal of providing the NAS with equipment that is interoperable, reliable, and technologically superior. Since the FAA usually retains existing systems beyond their planned service life, affordable and rapid technology insertion depends, in part, on FAA's ability to define standard solutions across systems based on performance and interface requirements. Adoption of application-independent data standards will help the FAA integrate and share NAS information across multiple systems, programs, government agencies, industry, and the international community.

1.1 Scope

This Standard describes the detailed NAS data specifications for use in defining all data interfaces controlled by the NAS Configuration Control Board, that is, interfaces specified in an Interface Requirements Document (IRD) – or, where there is no parent IRD for data specifications, the Interface Control Document (ICD) – that becomes a NAS Configuration Item. This Standard also applies to data required for two or more NAS systems, regardless of the storage or transmission media used; e.g., manually-transmitted adaptation data that is not specified in an IRD or ICD.

1.2 Purpose

The purpose of this Standard is to establish and communicate application-independent data exchange requirements to be applied during the development and support of software systems. Each individual data standard is a description of a data element shared among NAS Information Systems¹ and is portrayed through a common set of metadata (data *about* data). The metadata set is compliant with the recommendations set forth in ISO/IEC 11179² and follows best practices for managing shareable data. Appendix C of this document contains a list of the individual data standards that meet requirements of the NAS systems. This list, which is managed through the authority of the NAS Configuration Control Board, is dynamic and changes to meet the information needs of the FAA. The individual data standards are maintained in the FAA Data Registry (FDR) tool and are available at the FDR web site (see Appendix C).

¹ Refer to Definitions in Appendix B

² Refer to Section 2.2

1.3 Applicability

The established individual data standards shall be applied to new procurements through the Acquisition Management System (AMS) guidance and procedures. The FAA does not require the data standards to be retrofitted to existing NAS systems, although it is good practice to consider them during periods of software upgrade. Other NAS stakeholders are encouraged to adopt this Standard.

This Standard is applicable to the following:

- a. All programs responsible for developing and acquiring NAS systems that involve data interfaces that are controlled by the NAS Configuration Control Board (i.e., interfaces specified in an Interface Requirements Document or Interface Control Document³ that becomes a NAS Configuration Item).
- b. All new information systems, automated as well as those in which non-automated data is sourced and entered through manual processes.
- c. Persons developing proposed legislation that will result in the collection of data.

1.4 Tailoring

Tailoring is the process of selecting individual, applicable data standards for a specific acquisition. The following steps are required whenever this Standard is to be tailored for a specific project. Refer to Appendix A, Part II for additional guidance.

1.4.1 Identifying data requirements

The responsible developing organization shall document the specific technical data characteristics of the target project environment, including data elements of interest for which data standards are needed, i.e., data elements ordinarily specified in an Interface Requirements Document or Interface Control Document⁴.

1.4.2 Selecting applicable data standards

For each data element of interest the responsible developing organization shall select from the FAA Data Registry, when possible, the applicable data standard to be used as part of the target system.

³ I.e., Interface Control Documents with no parent Interface Requirements Document; see Section 1.1

⁴ Ibid.

1.4.3 Specifying data elements of interest needing a data standard

For each data element of interest for which there is no applicable data standard in the FAA Data Registry, the responsible developing organization shall compile the initial metadata by specifying the following at a minimum: descriptive name, definition, data type, permissible values and value meanings (for enumerated value domains) or a description of the value domain (for non-enumerated value domains), units of measure for data elements involving quantities, interchange format, low and high values, and maximum length. See Appendix A, Part I for definitions of these meta-attributes.

1.4.4 Soliciting inputs

The responsible developing organization shall solicit inputs regarding the data standards selected and the data standards needed from those organizations that will interface with or be affected by the target system, e.g., all stakeholder organizations, users, support personnel, contracting officers, and potential bidders. Once consensus has been reached by the stakeholders regarding what the applicable data standards are and which data elements of interest need data standards, these decisions become part of the Interface Requirements Document or Interface Control Document⁵.

1.4.5 Reuse of existing software code

Situations may arise in which the reuse of inherited software code, including the data standards and definitions that were employed when the code was developed, is found to be economically advantageous, or that reworking the reused code to comply with FAA-STD-060 may add risk, cost and schedule delays to the target project. In this case the developing organization shall be responsible for documenting the existing data exchange requirements in accordance with FAA-STD-025 E, Section 4.4.1.3, Information Units.

1.5 Compliance

This Standard requires that new NAS applications be in conformance with the individual data standards listed in Appendix C of this document. For example, the data fields specified in the interface requirements for new applications will be in compliance with the Standard and the metadata for these data fields will be specified in accordance with developer requirements shown in Appendix A. It does not, however, establish a requirement to reengineer existing applications to conform to new data exchange requirements.

⁵ I.e., Interface Control Documents with no parent Interface Requirements Document; see Section 1.1

2.0 Reference Documents

2.1 Government Documents

Federal Aviation Administration

Standards

FAA-STD-025E	Preparation of Interface Documentation
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Policies and Orders

FAA Order/Policy 1375.1 c FAA Order 1800.66	FAA Data Management Policy, June 20, 2001 Configuration Management Policy, December 13, 2000
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2.2 Non-Government Documents

International Organization for Standardization/International Electrotechnical Commission

ISO/IEC 11179-1: 1999	Information technology – Specification and standardization of data elements – Part 1: Framework for the specification and standardization of data elements
ISO/IEC 11179-2: 2000	Information technology – Specification and standardization of data elements – Part 2: Classification for data elements
ISO/IEC 11179-3: 2003	Information technology – Metadata registries (MDR) – Part 3: Registry metamodel and basic attributes
ISO/IEC 11179-4: 1995	Information technology – Specification and standardization of data elements – Part 4: Rules and guidelines for the formulation of data definitions
ISO/IEC 11179-5: 1995	Information technology – Specification and standardization of data elements – Part 5: Naming and identification principles for data elements
ISO/IEC 11179-6: 1997	Information technology – Specification and standardization of data elements – Part 6: Registration of data elements

2.3 Document Sources

2.3.1 FAA Documents

Copies of FAA specifications, standards, and publications may be obtained from the Contracting Officer, Federal Aviation Administration, 800 Independence Avenue, SW, Washington D.C., 20591. Requests shall clearly identify the desired material by number and date, and state the intended use of the material. FAA publications are also available on the FAA Acquisition System Toolset (FAST) Web site <http://fast.faa.gov/>

2.3.2 ISO Documents

Copies of ISO standards can be obtained electronically from the Web site <http://www.iso.ch/iso/en/prods-services/ISOstore/store.html>. Paper standards are available through Global Engineering Documents, 15 Inverness Way East, Sales – C303B Englewood, CO 80112-9649, Telephone: (800) 854-7117, FAX (303) 397-2740 or at the Web site <http://global.ihs.com/>.

2.4 Order of Precedence

In the event of conflict between the documents listed herein and the contents of this Standard, the contents of this FAA-approved Standard shall be the superseding requirement.

2.5 Document Maintenance

Changes and updates to this Standard, including the individual data standards listed in Appendix C, shall be proposed via NAS Change Proposal (NCP) and processed through the NAS Configuration Control Board. Under the FAA's Data Management Policy and this Standard, the FAA Data Registry (FDR) is the authoritative source for data standards, each of which is assigned to a Data Steward organization. The appointed Data Registrar is charged with the responsibility for FDR maintenance and operational availability. At least every 5 years or as determined by the Data Steward, each data standard will be reviewed for applicability to the NAS and updated if required.

3.0 Requirements

The individual data standards listed in Appendix C shall be used in all applicable⁶ NAS Information Systems⁷. Data standards in Appendix C shall be maintained in the FAA Data Registry and published at the FDR web site (see Appendix C).

⁶ Refer to Section 1.3

⁷ Refer to Definitions in Appendix B

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Appendix A

Part I

Developer Compliance Requirements

The metadata requirements for data element interchanges between systems with which developers must comply when creating or implementing interface requirements are listed in the following table. An example of the report used to describe a data element standard according to its meta-attributes immediately follows the table (see page A-6).

Meta-Attribute	Definition	Compliance Requirement
Data Identifier	A language independent identifier of the data element that, together with its Version, uniquely identifies it in the FAA Data Registry.	Developers shall specify the data identifier, version, preferred name, and context in data requirements specifications.
Version	An identification of the latest or previous update in a series of evolving data specifications within the FAA Data Registry.	Developers shall specify the data identifier, version, preferred name, and context in data requirements specifications.
Context	A designation or description of the application environment or discipline in which a data standard is applied or originates from. Alternatively, the scope in which the subject data element has meaning. A <i>Context</i> may be a business domain, an agency, an information subject area, an information system, a database, file, data model, standard document, or any other environment.	Developers shall ensure that the specified context is applicable to their development environment when using the data standard. Developers shall specify data identifier, version, preferred name, and context in data requirements specifications.
Context Definition	A natural language textual statement that expresses the essential nature of the context, and permits its differentiation from all other contexts.	In data requirements specifications, the definition shall be used as is without modifications of any kind.
Preferred Name	A single or multiple word meaningful designation assigned to the data element.	Developers shall specify the data identifier, version, preferred name, and context in data requirements specifications.
Definition	A natural language textual statement that expresses the essential nature of the data element specified in the standard, and permits its differentiation from all other data elements.	When data definitions are included in applications, the definition shall be used as is without modifications of any kind.
Data Type	A set of distinct values, characterized by properties of those values and by operations on those values, for example the category used for the collection of letters, digits, and/or symbols to depict values of a Data Element determined by the operations that may be performed on the Data	In data requirements specifications developers shall, on the interface, represent the associated concept with the data type; i.e., use the data type specified in the data standard.

Meta-Attribute	Definition	Compliance Requirement
	Element. Examples of data types are bitmap, Boolean, real, integer. See the FAA Data Registry for additional information.	
Data Type Definition	A statement that expresses the essential nature of a data type associated with a data element's value domain, and permits its differentiation from all other data types.	In data requirements specifications developers using any of the data types maintained in the FAA Data Registry shall conform to the form of the data type specified in the data type's corresponding definition.
Character Set	A collection of graphic symbols (e.g., letters or glyphs) used in writing or printing, in which each character in the collection is assigned a numeric index in a particular coding table. Examples of character sets include US (7-bit) ASCII, EBCDIC, Unicode.	In data requirements specifications developers shall comply with the character set specified for data element interchanges between systems.
Permissible Values	The set of representations of allowable instances of an enumerated value domain of a data element, represented according to the interchange format, data type, and maximum length constraints. The set of representations of permissible instances is associated with one set of value meanings . The set can be specified by name (e.g., Postal U.S. State Codes), reference to a source, enumeration of the instances' representations (e.g., AL, AK, etc.), or rules for generating the instances.	In data requirements specifications developers shall use the permissible value and value meaning pairs exactly as is, without changes of any kind, whether they are explicitly identified or identified by reference to the source. When transmitting the data, an application may use a subset of the permissible values, but when receiving the data, an application must be able to correctly accept any and all of the permissible values.
Value Meaning	A statement that expresses the essential nature of a set of permissible values without a specific representation, and permits its differentiation from all other sets. The set can be specified by name (e.g., the states of the United States), or enumeration of the meanings of each permissible value (e.g., the state of Alabama, the state of Alaska, etc.).	In data requirements specifications developers shall use the permissible value and value meaning pairs exactly as is, without changes of any kind.
Non-Enumerated Value Domain Description	A description of a value domain that contains a wide range of data values that cannot be listed, i.e., is not an enumerated value domain. The ranges can usually be described by a set of rules. Example (for "text" value domain): "A string of alphanumeric characters (formatted or unformatted)."	In data requirements specifications developers shall conform to the specified form of the value domain description for non-enumerated value domains.
Maximum Length	The maximum number of storage units (of the corresponding data type) needed to represent a	In data requirements specifications developers shall constrain the length of

Meta-Attribute	Definition	Compliance Requirement
	data element. The storage units are considered to be ASCII characters unless otherwise specified.	the data element to be no greater than the maximum length specified.
Minimum Length	The minimum number of storage units (of the corresponding data type) needed to represent a data element. The storage units are considered to be ASCII characters unless otherwise specified.	In data requirements specifications developers shall constrain the length of the data element to be no less than the minimum length specified.
Interchange Format	A single or multiple word designation assigned to a form of interchange for a data element, that permits its differentiation from all other interchange formats, e.g., YYYYMMDD for calendar date, where YYYY represents a year, MM represents an ordinal numbered month in a year, and DD represents an ordinal numbered day of a month. See the FAA Data Registry for interchange format notation.	In data requirements specifications developers shall comply with the form of interchange specified for data element interchanges between systems.
Unit of Measure	A single or multiple word designation assigned to a measurement framework for data elements with representational forms of quantity, e.g., watt, mile, miles-per-hour, ton, ampere.	In data requirements specifications developers shall not use units of measure other than the one specified for a particular data element. Note: this meta-attribute applies only to quantity-oriented data elements.
Unit of Measure Definition	A statement that expresses the essential nature of a measurement system associated with a data element, and permits its differentiation from all other units of measure.	In data requirements specifications developers shall conform to the form of measurement unit specified in its unit of measure description. Note: this meta-attribute applies only to quantity-oriented data elements.
Unit of Measure Precision	The degree of specificity for a Unit of Measure, expressed as the number of decimal* places to be used in the data element's values. *Precision may be reported in non-decimal units, e.g., in eighths, sixty-fourths, etc. Decimal is assumed unless otherwise specified.	In data requirements specifications developers shall constrain the precision of the data element to the degree specified for the given context.
Low Value	The lowest value in the range of permissible values for a data element with representational form of quantity.	In data requirements specifications developers shall constrain data element permissible values to be no lower than the low value specified.
High Value	The highest value in the range of permissible values for a data element with representational form of quantity.	In data requirements specifications developers shall constrain data element permissible values to be no higher than the high value specified.

Meta-Attribute	Definition	Compliance Requirement
INFORMATIVE	The following meta-attributes provide additional information to developers.	
Administered Item Type	The type of data component as managed in the FAA Data Registry, e.g., data element, value domain, object class.	N/A
Alternate Name(s)	The synonymous name(s) by which a data element is known in this or other application environments or contexts.	N/A
Alternate Name Type	The type of name as designated in the FAA Data Registry, e.g., familiar name, XML tag, etc.	N/A
Alternate Name Context	The context in which the alternate name is used or has meaning.	N/A
Related Data Element(s)	A data element that has a special relationship or association with the subject data element.	N/A
Relationship	The nature of the association between the subject data element and the related data element, e.g., part of, similar to, etc.	N/A
Example	A representative sample of an instance of the data element.	N/A
Effective Begin Date	The date that a data standard is approved for use.	N/A
Effective End Date	The date that a data standard is no longer approved for use.	N/A
Steward Organization	The organization that has responsibility for the quality of meta-attribute contents for a data element.	N/A
Comments	Additional explanatory information.	N/A

DATA ELEMENT STANDARD**Data Identifier:****Version:****Context:****Context Definition:****Preferred Name:****Definition:**

[Space is dynamically allocated to accommodate the full text of the definition.]

Data Type:**Data Type Definition:****Character Set:****Enumerated Value Domain Permissible****Values:****Value Meanings:**

[Space is dynamically allocated to accommodate the number of permissible values.]

Non-Enumerated Value Domain Description:

[Space is dynamically allocated to accommodate the full text of the value domain description.]

Maximum Length:**Interchange Format:****Minimum Length:****Unit of Measure:****Unit of Measure Definition:****Unit of Measure Precision:****Low Value:****High Value:***Informative Meta-Attributes****Administered Item Type:******Alternate Names (Name, Name Type, Context):******Example:******Related Data Elements (Name, Version, Context, Nature of Relationship):******Steward Organization:******Effective Date:******End Date:******Comments:***

PART II

Tailoring Guidance

The primary reference that should be consulted to determine the existence of or need for a data standard is the FAA Data Registry (FDR). The FDR is a tool for recording, publishing, and maintaining metadata about application-independent data standards. The FDR Portal is available on the Internet at <http://fdr.faa.gov/>. It provides information about the precise meaning of data, and it provides a place to capture information during the development of data standards. It is the authoritative source for FAA data standards.

The first activity is to compare the data element of interest with metadata of existing data standards in the FDR. The interface requirements developer should prepare for this activity by compiling the following information for the data element of interest:

- Definition or description of the data element
- Common name of the data element
- Context in which the data element is applicable or has meaning
- Range of values that the data element may assume

The developer is then ready to begin the comparison search of the FDR. This task is generally a discovery effort in which the developer assesses the contents and determines the similarities of any new finds and the data element of interest. The following is the suggested priority of comparison:

1. **Similar or same definition.** If the data element of interest and existing FDR entries have about the same definition, which describes their purpose, further investigation is clearly warranted.
2. **Similar or close range of permissible values.** If the data element of interest and an existing FDR entry have nearly the same value domain, further investigation is warranted.
3. **Similar or same name.** If the data element of interest and existing FDR entries have about the same name, or have the same name in a different context, which suggests similar usage, further investigation is warranted.

In each situation, a continuation of the specific investigation implies that there may be a basis for adopting the FDR standard data element in lieu of the data element of interest. Interface requirements developers are encouraged to submit their data elements for which standards do not exist to the NAS Configuration Control Board as potential candidates for standardization. More detailed guidance is contained in the *NAS Data Standardization Procedures* document located on the FDR Portal.

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Appendix B

Definitions

Application. A computer program designed for a specific task or use.

Data. Representation of facts, concepts, or instructions in a formalized manner suitable for communication, interpretation, or processing by human or automated means.

Data Element. A basic unit of identifiable and definable information that occupies the space provided by fields in a record or blocks on a form. A data element has an identifying name and value or values for expressing specific facts.

Data Registrar. The Data Registrar administers the FAA Data Registry, a repository for FAA data standards. The Data Registrar provides advice to the Data Stewards on data registration procedures, national and international standards, data stewardship practices, and data harmonization procedures.

Data Steward. A Data Steward manages the development, standardization, and certification of data within an assigned area of responsibility. A Data Steward is responsible for the accuracy, reliability, quality, and currency of descriptive information (metadata) about data in an assigned area of responsibility.

Developer or Developing Organization. An organization with primary responsibility for developing or acquiring an information system. If a contractor develops a system, the FAA organization responsible for that contract is the developing organization.

FAA Data Registry (FDR). A tool that supports the registration and standardization of data elements and other administered items by recording and disseminating data standards, which facilitates data sharing among organizations and users. A data registry provides users of shared data a common understanding of a data element's meaning, attributes, and unique identification. Approved data standards in the registry will be used by information systems developers to enable data sharing.

Interface. The performance, functional, and physical attributes required to exist at a common boundary.

Information System. A combination of information, computer, automation system, telecommunications resources, personnel resources, and other information technology that collects, records, processes, stores, communicates, retrieves, and displays data.

Metadata. Metadata includes information that describes the characteristics of data; facts or information about data; and descriptive information about an organization's data activities, systems, and holdings.

NAS Data. NAS data are the data shared among NAS applications and specified in Interface Requirements Documents or Interface Control Documents⁸ that are configuration managed by the NAS Configuration Control Board.

NAS Change Proposal. FAA Form 1800-2 is used to propose changes to or establish baselines of NAS systems/subsystems and their associated documentation.

NAS Configuration Control Board. The senior board responsible for establishing and maintaining NAS-level baseline.

NAS Information System. An information system that provides a solution for NAS requirements.

NAS System. Hardware or software or a combination thereof that provide a solution for NAS requirements.

New Procurements. New Procurements are defined as acquisitions:

- a. That have not yet been approved by the Joint Resource Council (JRC), or
- b. For which the Final Requirements Document (FRD) has not been approved by the JRC.

Standard Data Element. A data element that has been formally approved in accordance with the Standardization procedures. Alternatively, standard data elements are data that have been coordinated through the standardization process and approved for use in information systems.

System Owner. The manager responsible for the organization that sets policy, direction, and manages funds for an information system. Systems under development are owned by the developing organization until accepted and authorized by the operating organization.

⁸ I.e., Interface Control Documents with no parent Interface Requirements Document; see Section 1.1

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Appendix C

Report of Data Standards

This appendix contains reports showing key information in a common format for each data standard, as well as a summary list of those standards. Individual data standards are maintained on the FAA Data Registry (FDR) Portal at <http://fdr.faa.gov/>. The FDR is the authoritative source for data standards and the reader is directed to that on-line source for the active standards. Within the FDR, the individual data elements are part of a larger set of components broadly referred to as administered items. The summary list holds (1) the item's identification number assigned by the FDR, (2) the formal preferred name given to the administered item in accordance with the FDR data naming conventions, (3) the context in which the standard applies, and (4) the date on which the standard became effective.

The summary list is available on the FDR Portal as a Portable Document Format (PDF) file entitled "List of Approved Standards Report (*date*)". The list is indexed to the individual data standards reports, which are part of the PDF file. To perform more advanced searches for data standards or to see more information about current or proposed standards, users should access the FDR itself, either by using an FDR_GUEST account or by obtaining an individual account as directed on the Portal.