FAA-STD-060, Rev. A
October 4, 2002

U.S Department
of Transportation

**Federal Aviation
Administration**

U.S. Department of Transportation

Federal Aviation Administration Standard

DATA STANDARD
FOR
THE NATIONAL AIRSPACE SYSTEM (NAS)

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 National Airspace System Configuration Control Board (NAS CCB) (e.g., 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 [CI]).

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 Systems[1] 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 11179 [2] 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 CCB, 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).

1.3 Applicability

The established individual data standards shall be applied to new procurements through 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

[1] Refer to Definitions in Appendix B
[2] Refer to Section 2.2

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 CCB (e.g., interfaces specified in an IRD/ICD[3] that becomes a NAS CI).

b. All new information systems, automated as well as manual.

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 IRD/ICD[4].

1.4.2 Selecting applicable data standards

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

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 FDR, 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.

[3] For ICDs with no parent IRD; see Section 1.1
[4] Ibid.

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 IRD/ICD[5].

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 unless a satisfactory cost-benefit result can be demonstrated.

2.0 Reference Documents

2.1 Government Documents

Federal Aviation Administration

Standards

FAA-STD-026	Software Development for the NAS, June 6, 2001

Policies and Orders

FAA Order/Policy 1375.1 c	FAA Data Management Policy, June 20, 2001
FAA Order 1800.66	Configuration Management Policy, December 13, 2000

Department of Defense

4120.24 – M	Defense Standardization Program Policies and Procedures, March 2000

[5] For ICDs with no parent IRD; see Section 1.1

2.2 Non-government Documents

Institute of Electrical and Electronics Engineers/Electronic Industries Association

IEEE/EIA 12207.0	Software Life Cycle Processes, 1996
IEEE/EIA 12207.1	Software life Cycle Processes – Life Cycle Data, 1997
IEEE/EIA 12207.2	Software Life Cycle Processes – Implementation Considerations, 1997

International Organization for Standardization/International Electrotechnical Commission

ISO/IEC 11179	Information Technology-Specification and Standardization of Data Elements, December 11, 1996

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 DOD Documents

Copies of Defense Standardization Program Policies and Procedures may be obtained from the Web site http://www.dsp.dla.mil/.

2.3.3 IEEE Documents

Copies of IEEE standards may be obtained from IEEE Customer Service, 445 Hoes Lane, PO Box 1331, Piscataway, NJ 08855-1331, USA. Phone: 1-800-678-IEEE (in the US and Canada), FAX 1-732-981-9667, On-line http://www.ieee.org.

2.3.4 EIA Documents

Copies of EIA standards may be obtained from the Electronic Industries Association, 2001 Eye Street, NW, Washington, DC 20006.

2.3.5 ISO Documents

Copies of ISO standards can be obtained electronically from the Web site http://webstore.ansi.org/ansidocstore/shopper_lookup.asp. Paper standards are available through Global Engineering Documents, 15 Inverness Way East, Sales – C303B Englewood, CO 80112-9649, Telephone: (800) 854-717, 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 CCB. Under the FAA's Data Management Policy and this Standard, the FDR is the authoritative source for data standards, each of which is assigned to a Data Steward. 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 applicable[6] NAS Information Systems[7]. 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

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-5). While these standards apply to interfaces, developers are encouraged to use them in internal application code and data bases wherever possible.

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 (FDR).	Developers shall specify data identifier, version, and descriptive name in data requirements specifications.
Version	An identification of the latest or previous update in a series of evolving data specifications within the FDR.	Developers shall specify data identifier, version, and descriptive name in data requirements specifications.
Descriptive Name	A single or multiple word meaningful designation assigned to the data element.	Developers shall specify data identifier, version, and descriptive name 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 single or multiple word designation assigned to a data type associated with a data element's value domain. Examples of data types are binary, bitmap, Boolean, date, real, integer, string, time. See FDR for additional information.	In data requirements specifications developers shall use the data type specified in the data standard.
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 FDR shall conform to the form specified in the data type's corresponding definition.
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	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.

Meta-Attribute	Definition	Compliance Requirement
	a source, enumeration of the instances' representations (e.g., AL, AK, etc.), or rules for generating the instances.	
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.
Value Domain Definition	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), e.g., a street name, the contents of a document or message, etc."	In data requirements specifications developers shall conform to the specified form of the value domain definition for non-enumerated value domains.
Maximum Length	The maximum 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 greater than the maximum 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.	In data requirements specifications developers shall comply with the form of interchange specified for data element interchanges between systems and should use that form in application code and databases where practical.
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.

Meta-Attribute	Definition	Compliance Requirement
Low Value	The smallest permissible value for data elements with representational forms 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 largest permissible value for data elements with representational forms 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 FDR, e.g., data element, value domain, object class.	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**:

Descriptive Name:

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

Data Type: **Data Type Definition**:

Permissible Values:
(for enumerated value domains)

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

Value Meanings:

Value Domain Definition:
(for non-enumerated value domains)

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

Maximum Length: **Interchange Format**:

Unit of Measure: **Unit of Measure Definition**:

Low Value: **High Value**:

Informative Meta-Attributes

Administered Item Type:

Example:

Steward Organization:

Effective Date: ***End Date***:

Comments:

FAA-STD-060, Appendix A

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. 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 NAS 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 compile the following information for the data element of interest:

- Definition or description of the data element
- Common name of the data element
- Range of values that the data element may assume

The developer should then begin a 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, 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.

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.

FAA Data Registry. 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.

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.

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 Documents[8] that are configuration managed by the NAS CCB.

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

NAS Information System. An information system that provides 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.

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

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] For ICDs with no parent IRD; see Section 1.1

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 in the FAA Data Registry (FDR) 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 name given to the administered item in accordance with the FDR data naming conventions, and (3) the date on which the standard became effective.