ORDER

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

1375.1C

6/20/01

SUBJ: DATA MANAGEMENT

1. PURPOSE. This order establishes agencywide Federal Aviation Administration (FAA) policy on data management.

2. DISTRIBUTION. This order is distributed to the division level in the Washington headquarters, regions, centers, and limited distribution to all field offices and facilities.

3. CANCELLATION. Order 1375.1B, Data Standards, dated November 11, 1980, is canceled.

4. SCOPE. This order is applicable to all FAA data used in the performance of its mission. This includes all data that is collected, stored, processed, disseminated, or transmitted using FAA or non-FAA information systems.

5. EXPLANATION OF CHANGES. This revision:

a. Emphasizes data management as an essential agency program with data being an enterprise resource.

b. Establishes a comprehensive, corporate Data Management Program rather than strictly data standardization.

c. Establishes responsibilities for data management within each line of business (LOB) and staff office (SO).

d. Establishes the key infrastructure necessary to support the Data Management Program.

6. BACKGROUND. The FAA is a data-driven organization. The FAA's Data Management Strategy, dated September 21, 1999, outlines the agency's approach for the efficient and effective management of data. This order establishes the concepts of the Data Management Strategy as an on-going program for the management of FAA data. This order also supports the "information goal" of the FAA Information Technology Strategy, dated September 22, 1999, which is to make reliable information available quickly. Both of these strategies identify data management as essential to the long-term performance of FAA's mission and functions and the

successful implementation of key initiatives to modernize the National Airspace System (NAS) and improve safety, security, and administrative information systems.

7. DEFINITIONS. Appendix 1, Definitions, defines the terms used in this order.

8. AUTHORITIES. Appendix 2, Authorities, contains public laws, executive orders, federal regulations, and orders that apply to the management of FAA data.

9. POLICY.

a. FAA data are an enterprise resource that must be managed from an enterprise perspective. LOB's and SO's, as custodians of agency data, are responsible for the timeliness, accuracy, understandability, availability, and security of the data under their stewardship.

b. The FAA shall establish a Data Management Program. This program consists of data registration, data standardization, data certification, and data life cycle management.

c. High data quality, availability, and appropriate confidentiality shall be engineered into new information systems and into the processes that create new data.

10. POLICY IMPLEMENTATION.

a. The Assistant Administrator for Information Services and Chief Information Officer (AIO) is the lead office for implementation of the FAA Data Management Program. This program will establish sound data management practices around the maintenance of existing (legacy) data and the development of new data, by designating the necessary staff and resources to implement the program. This program will be implemented incrementally as resources can be planned for in a manner consistent with annual appropriations. However, each LOB and SO should establish the target of fully funding and implementing this program by fiscal year 2004.

b. This program will involve two parallel processes for data standardization for the two major categories of FAA data – NAS and non-NAS. The definitions of NAS and non-NAS data are found in Appendix 1. The data standardization process does not envision standardizing all FAA data, rather, efforts will concentrate on core data that are mission critical, or have cross-organizational, other government agency, aviation industry, or international requirements to do so. The NAS Configuration Control Board (NAS CCB) and the NAS Information Architecture Committee (NIAC) will manage the standardization process for NAS data. Based on the experience gained by the NAS CCB, a parallel process for standardization of non-NAS data will be implemented.

c. Sound data management practices discussed in paragraph 10.a. include:

(1) Establishing the importance of data to the agency and treating data as a vital resource.

(2) Assigning responsibility for agency data.

(3) Adopting life cycle management of agency data. The data life cycle encompasses creation through implementation to destruction. Thoughtful planning is required for the business use, retention, and expiration of data. The key elements of the life cycle process are:

(a) Implementing a data standardization initiative by identifying critical data for standardization and using established standards for new data development, with formal change control procedures for established standards.

(b) Understanding the agency's data and information chains that provide that data. This involves knowing what data the agency controls, where the data come from, how the data are used to support the mission, and who the customers are for the data.

(c) Registering existing data. This involves identifying the data produced by the agency's information systems, describing and cataloging data elements, assigning an unambiguous identifier to each data element in a way that makes the assignment available to interested users, and administering formal change control procedures for registered data.

(d) Certifying new data. This primarily involves researching and verifying that data needs cannot be satisfied by existing data sources, and that the data adhere to established standards and architecture. The intent is to reduce redundant data and unnecessary system development.

(e) Retiring obsolete and redundant data where economically feasible.

d. Establishing corporate forums to coordinate the management of data across organizational lines.

e. Practicing data quality assurance. For legacy data this involves improving data quality when there is a clear benefit in terms of system efficiency or return on investment. For new data development this involves engineering data quality into the development of new information systems and supporting processes.

f. Establishing single sources for data.

g. Developing the appropriate skills for managing data through hiring and training.

h. Adopting industry-standard tools and techniques.

11. RESPONSIBILITIES. Effective data management depends on the involvement of organizations that acquire, develop, own, operate, or replace the agency's information systems. The intent of establishing these responsibilities is that each LOB and SO should have a person or persons who understand and manage that organization's data needs and environment. Appendix 3, Operational Reporting Relationships Between Key Data Management Functions,

depicts the operational reporting relationships between key data management functions within the FAA. The FAA LOB's and SO's shall comply with this order and carry out responsibilities as follows:

a. Each member of the Management Board shall:

(1) Implement the FAA Data Management Program within his or her respective organization according to the requirements of this order, in a manner consistent with annual appropriations.

(2) Appoint, in writing to AIO-1, a Designated Data Authority for his or her LOB or SO who is responsible for the Data Management Program within their organization. The Designated Data Authority should be a senior executive reporting directly to the Management Board member. Those SO's with few information systems may choose to consolidate this function under one Designated Data Authority for several SO's. AIO will work with each LOB and SO to determine a mutually agreed upon structure to implement this provision. At a minimum, each LOB, the Assistant Administrator for System Safety (ASY), the Assistant Administrator for Region and Center Operations (ARC), and the Assistant Administrator for Financial Services (ABA) should have a Designated Data Authority.

b. The LOB or SO Designated Data Authority shall:

(1) Appoint a Data Manager for his or her LOB or SO who has technical knowledge of the LOB's or SO's information technology architecture, information systems, and domain data. Those SO's with few information systems may choose to consolidate this function under one Data Manager for several SO's. At a minimum, each LOB, ASY, ARC, and ABA should have a Data Manager.

(2) Ensure that the Data Manager carries out the provisions of the Data Management Program.

(3) Ensure that the resources are available to implement the Data Management Program within his or her LOB or SO.

c. The LOB or SO Data Manager manages the Data Management Program within his or her LOB or SO and represents his or her LOB or SO in all matters relating to his or her organization's data. The Data Manager shall:

(1) Appoint Data Stewards for individual information systems within his or her LOB or SO. Those SO's with few information systems may choose to consolidate this function under one Data Steward for several staff offices.

(2) Provide technical representatives, as necessary, to the NIAC for the data standardization initiative of NAS data, or to the technical working group for non-NAS data. Those SO's with few information systems may choose to consolidate this function under one technical representative for several staff offices.

(3) Designate systems owners for the information systems within his or her organization.

(4) Promulgate and enforce approved FAA data standards, models, and architecture.

(5) Support the metadata repository (MDR) and FAA data registry (FDR) by registering LOB or SO information systems and their metadata.

(6) Ensure compliance with the MDR and FDR policies and procedures.

(7) Establish LOB or SO data quality assurance goals, objectives, parameters, procedures, metrics, and data quality guidance.

(8) Review and resolve LOB or SO data management issues.

(9) Work with external metadata standards groups related to their data to ensure that the FAA is compliant with these standards.

(10) Support the agency MDR and FDR by ensuring that data descriptions are maintained, information systems and metadata are registered, and the currency of the information therein is maintained.

(11) Coordinate data standardization activities with the NAS CCB and NIAC for NAS data or the standards approval board for non-NAS data.

(12) Ensure that developers are certifying new data prior to development in accordance with the procedures developed by AIO in consultation with the Data Managers.

(13) Ensure that data quality is engineered into new information systems development.

(14) Implement data quality assurance for legacy systems applications when there is a demonstrated positive return-on-investment or a critical mission need.

d. The Data Steward, under the direction of a Data Manager, is responsible for the documentation of the data for specific, assigned applications within his or her LOB or SO. The Data Steward shall:

(1) Be the subject matter expert for the data within the information systems they are assigned.

(2) Define, validate, maintain, and update requirements for specific subject area data (i.e., LOB or SO business rules and integrity rules).

(3) Submit candidate data elements for standardization and participate in standardizing metadata for specific subject areas.

(4) Develop, review, and validate FAA data products relating to their subject area.

(5) Ensure compliance with the FAA data architecture and perform a data quality role on a day-to-day basis.

(6) Ensure compliance with MDR and FDR policies and procedures.

(7) Resolve data integration issues of business naming standards, standard entity definitions, standard attribute definitions, business rules specifications, standard calculation and summarization definitions, entity and attribute aliases, data quality analyses, sources of data for the data warehouse, data security specifications, and data retention criteria.

(8) Ensure the alignment of the business requirements with the information technology support systems and encourage implementation of data standards within their functional area.

(9) Notify registered users of standard data elements within their functional area when changes are proposed to those standards.

(10) Review and consider comments and recommendations presented as the result of cross-functional reviews.

(11) Progress LOB and SO data elements through the FDR status levels.

e. The Assistant Administrator for Information Services and Chief Information Officer (AIO-1) is designated as the focal point and has overall responsibility for the FAA Data Management Program. AIO-1 shall:

(1) Sponsor the FAA MDR and FDR.

(2) Co-sponsor and provide a co-chair for the NIAC.

(3) Provide the FAA Designated Data Authority.

(4) Provide the FAA Data Manager.

(5) Provide the FAA MDR Administrator.

(6) Provide the FDR Registrar.

(7) Develop a parallel process to standardize non-NAS data modeled after the NAS CCB and NIAC data standardization process, using the standards approval board to review and approve non-NAS data standards.

(8) Direct the implementation of the International Standards Organization/ International Electrotechnical Committee (ISO/IEC) Standard 11179, "Information Technology - Specification and Standardization of Data Elements."

(9) Develop and maintain the agency policies and procedures for data management in coordination with LOB's and SO's.

(10) Develop agency strategies for continuous data management improvements in coordination with LOB's and SO's.

(11) Represent the agency on all data-related matters except those data issues expressly assigned by a higher authority.

(12) Identify, evaluate, and resolve FAA corporate data management issues in coordination with LOB's and SO's.

(13) Collaborate with the Data Managers to improve data quality and eliminate redundant and obsolete data.

(14) Promulgate an FAA data architecture.

(15) Establish a corporate data warehouse architecture in coordination with LOB's and SO's.

(16) Collaborate with the LOB and SO Data Managers to establish the threshold criteria for information systems that should be registered in the MDR.

(17) Collaborate with the LOB and SO Data Managers to establish threshold criteria for registration of new data in the MDR.

(18) Collaborate with the LOB and SO Data Managers to establish the data certification process.

(19) Provide information systems security support for the management of data.

(20) Sponsor and fund a training program for data management skills.

(21) Implement and manage the FAA data quality assurance initiative. This is a two-part program that provides a clearinghouse for research into "best practices" around engineering data quality into data development and, upon request, provides in-house consultants to analyze specific data quality problems and recommend solutions.

f. The Associate Administrator for Air Traffic Services (ATS-1), in addition to the general responsibilities listed in paragraph 11.a., shall:

(1) Host the operations and maintenance for the MDR and FDR within the ATS National Data Center.

(2) Co-sponsor the NAS CCB and NIAC.

(3) Provide a co-chair for the NIAC.

g. The Associate Administrator for Research and Acquisitions (ARA-1), in addition to the general responsibilities listed in paragraph 11.a., shall:

(1) Co-sponsor the NAS CCB and NIAC.

(2) Provide a co-chair for the NIAC.

h. The NAS CCB shall:

(1) Provide the final approval authority for establishing and promulgating FAA NAS data standards.

(2) Provide a point of coordination for on-going NAS data standardization efforts throughout the agency.

(3) Certify new NAS data development to the Joint Resources Council (JRC) in accordance with the data certification process established by AIO.

i. The NIAC shall:

(1) Coordinate the NAS data standardization process by conducting the analysis for standardizing NAS data elements and making recommendations to the NAS CCB for the same.

(2) Perform ad hoc analyses and studies for NAS data as required by the NAS CCB.

(3) Serve as technical consultants to the NAS CCB concerning NAS data management issues.

(4) Provide recommendations to the NAS CCB for certification of new NAS data development.

j. The JRC shall consider data certification in the evaluation of new information systems development.

k. Integrated Product Teams and Other Developers shall certify their data to the NAS CCB for NAS data or the standards approval board for non-NAS data as being compliant with the provisions of the FAA Data Management Program.

l. The FAA Designated Data Authority shall:

(1) Appoint an FAA Data Manager who has technical knowledge of the agency's information technology architecture, information systems, and data.

(2) Ensure that the FAA Data Manager carries out the provisions of the Data Management Program.

(3) Ensure that the resources are available for AIO to implement its responsibilities for the Data Management Program as listed in paragraph 11.e.

(4) Coordinate data management activities with the LOB and SO Designated Data Authorities.

m. The FAA Data Manager shall:

(1) Chair the FAA Data Management Forum (see section 12.a. for a description of the Forum).

(2) Work with the LOB and SO Data Managers to implement the FAA Data Management Program.

(3) Promulgate and enforce corporate data standards, the corporate data model, and the corporate data architecture.

(4) Approve FDR policies, structure, procedures, and formats.

(5) Supervise the MDR Administrator and FDR Registrar.

(6) Resolve technical issues associated with registered data concepts (e.g., overlap, duplication).

(7) Translate business rules and requirements into corporate data models.

(8) Establish corporate data quality assurance.

(9) Coordinate closely with the NAS CCB and NIAC on the data standardization initiative.

(10) Serve as the corporate focal point for the review and resolution of corporate data management issues within the LOB's.

(11) Oversee coordination with external groups requiring FAA data or metadata, including industry and international data standards groups.

n. The FAA Metadata Repository Administrator (MDR Administrator), under the direction of the FAA Data Manager, is the person dedicated to the control of corporate metadata resident in the MDR. The MDR Administrator shall:

(1) Manage the corporate functions of the MDR, under the direction of the FAA Data Manager. These corporate functions generally include coordination of MDR activities across LOB's and serving as the liaison between the Data Managers, Data Stewards, NAS CCB and NIAC, standards approval board, and the metadata repository managers in ATS.

(2) Be responsible for configuration management policies and procedures for the MDR.

(3) Monitor and manage the MDR contents.

(4) Coordinate MDR activities with LOB and SO Data Managers and Data Stewards.

(5) Coordinate metadata standards initiatives with external standards groups.

o. The FAA Data Registry Registrar (FDR Registrar) is the person dedicated to the control of data standards under the NIAC co-chairs for NAS data and the standards approval board for non-NAS data. The FDR Registrar has decision authority over the specification of the draft and final data standards. The FDR Registrar shall:

(1) Provide overall technical direction of FDR operations in accordance with ISO 11179 and FDR policies and procedures.

(2) Promote the reuse and sharing of data in the FDR within and across functional areas and among external interested parties (e.g., International Civil Aviation Organization).

(3) Monitor and manage the FDR content.

(4) Assist in the progression of data elements and concepts through FDR status levels.

(5) Assist in the resolution of technical issues associated with registered data concepts (e.g., overlap, duplication).

(6) Propose FDR policies, structure, procedures, and formats to the FAA Data Manager for approval.

12. KEY INFRASTRUCTURE. The following are enabling mechanisms that shall be used to implement the key components of the Data Management Program of data registration, data standardization, and data certification.

a. Data Management Forum. The FAA Data Manager chairs the Data Management Forum, which is comprised of the LOB and SO Data Managers. The Data Management Forum serves as a clearinghouse for corporate data management issues; reviews and recommends changes to the data standardization process; reviews and recommends changes to the FAA data architecture; recommends standards for database development and warehousing tools and methodologies; and generally oversees the components and processes of the corporate Data Management Program.

b. Data Management Tools. Three data management tools provide the infrastructure for this Data Management Program.

(1) FAA Metadata Repository. Information systems that meet established threshold criteria are registered in the FAA MDR in accordance with the procedures developed by AIO. System owners populate and maintain the MDR with the business and technical metadata for their registered information systems. The MDR adheres to industry and international standards.

(2) FAA Data Registry. The FDR is the enabling mechanism for data element standardization and registration. Core data elements are standardized through an FAA data standards initiative. Core data elements are defined as those data elements that are shared across organizational lines, support mission critical functions, or represent the greatest data needs of the agency and its customers. Data elements selected for standardization are registered in the FDR in accordance with the procedures developed by the NAS CCB and NIAC for NAS data and the standards approval board for non-NAS data. The FDR adheres to industry and international standards.

c. FAA Data Marts and Warehouses. Data marts will be created for selected data domains where analysis establishes a clear business need. These data marts will be developed in accordance with a corporate data warehousing architecture established by AIO to ensure future integration and interoperability.

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Administrator

APPENDIX 1. DEFINITIONS

Availability. Timely, reliable access to data and information services for authorized users.

Business Metadata. This is unstructured metadata. Describes things like how the data are used, who uses it, what it's used for, and what mission or function it supports. It may describe how the information was calculated, the source, the business rules applied, the access, the steward, and freshness of the data. It provides the roadmap that helps users find, interpret, and share data of interest.

Chief Information Officer (CIO). Senior official in an organization responsible for coordination of corporate IT policy, investment, and infrastructure.

Core Data Element. Those data elements that are shared across organizational lines, support mission critical functions, or represent the greatest data needs of the agency and its customers.

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 Management. The function of managing data used in manual or automated information systems. It includes the activities of strategic data planning, data element standardization, information management control, and data synchronization (e.g., arranging data to indicate coincidence or coexistence, data quality assurance, and database development and maintenance).

Data Manager. The Data Manager manages the data within their LOB or SO. The Data Manager is the point of contact for all issues concerning their LOB or SO's data and serves as the LOB representative on any FAA data management forums.

Data Mart. A subset of the data resource, usually oriented to a specific purpose or major data subject, that may be distributed to support business needs. Data marts are essentially data warehouses that are engineered to support a specific functional or business area.

Data Registry. A tool that supports the registration and standardization of data elements and other administered components 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 System. A combination of procedures, data codes, classifications, processes, records, and reports used for the processing of records or to meet agency information requirements.

Data Steward. The Data Steward is responsible for the data in specific information systems. The Data Steward provides the definition and parameters of a data element or entity.

Data Warehouse. An implementation of an informational database used to store sharable data sourced from an operational database of record. It is typically a superset database that allows users to tap into a company's vast store of operational data to track and respond to business trends and facilitate forecasting and planning efforts.

Data Warehouse Architecture. An integrated set of products that enable the extraction and transformation of operational data to be loaded into a database for end-user analysis and reporting.

Designated Data Authority. A senior FAA management official, appointed in writing by a Management Board member, who is responsible for the Data Management Program within their organization.

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.

Information. Any communication or representation of knowledge such as facts, data, or opinions in any medium or form, including textual, numerical, graphic, cartographic, narrative, or audiovisual form. Data that have been processed in such a way that it can increase the knowledge of the person who receives it. Information is the output, or finished goods, of information systems.

Information System. A discrete set of information resources, either in stand-alone or networked configurations, that is organized for the collection, processing, maintenance, transmission, and dissemination of information in accordance with defined procedures, whether automated or manual. Information systems are of two types:

a. General Support Systems. Interconnected information resources that are under the same direct management control and share common functionality, e.g., telecommunications and networks.

b. Major Application Systems. Systems that require special management attention because of their importance to the agency's mission; their high-maintenance, development, or operating costs; or their significant role in dealing with the agency's programs, finances, property, or other resources.

Information Technology (IT). As defined by the Clinger-Cohen Act of 1996, the term "information technology", with respect to an executive agency means any equipment or interconnected system or subsystem of equipment that is used in the automatic acquisition, storage, manipulation, management, movement, control, display, switching, interchange, transmission, or reception of data or information by the executive agency.

Legacy Data. This refers to data contained in a legacy information system, which is any system that is operational as opposed to under development.

Life Cycle. There are two categories of life cycle:

a. Data. The stages through which data pass typically characterized as creation or collection, processing, dissemination, use, storage, and disposition.

b. Information System. The phases through which an information system pass, typically characterized as initiation, development, operation, termination, and decommissioning.

Major Application System. Any application that requires special attention to its data because of the value of the information collected and managed by that system as determined by the system owner. Typically the system will be composed of one or more databases and utilize a robust commercial-off-the-shelf (COTS) database management system (DBMS). The system has been determined to meet the threshold criteria for registration of the system in the MDR.

Management Board. The FAA Management Board is chaired by the Administrator, and its membership consists of the Deputy Administrator, Assistant and Associate Administrators, and other staff members as designated by the Administrator.

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

Metadata Repository. An MDR is a collection of information about information systems and their data. Definitions and components of a data and information architecture are held in a metadata repository.

NAS Data. NAS data are the data shared among NAS applications and specified in Interface Requirements Documents that are configuration managed by the NAS CCB.

Non-NAS Data. All FAA data not specifically configuration managed by the NAS CCB.

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.

Technical Metadata. This is structured metadata. Describes the physical characteristics of the data, such as the element name, size, numeric or alphanumeric, or steward. Structured data consist of data entities, attributes, and relationships. It helps the application access and manipulate the data. It provides a standard to allow for interoperability of systems and information.

APPENDIX 2: AUTHORITIES

This appendix contains public laws, executive orders, federal regulations, and orders that might apply to the management of FAA data.

1. FAA Data Management Strategy, dated September 21, 1999.

2. FAA Information Technology Strategy, dated September 22, 1999.

3. FAA Order 1370.82, FAA Information Systems Security Program, dated June 9, 2000.

4. FAA Order 1370.52D, Information Resources Policy, dated December 1996.

5. FAA Order 1800.66, Configuration Management Policy, dated December 13, 2000.

6. Charter for the NAS Information Architecture Committee, dated December 19, 2000.

7. Computer Security Act of 1987, Public Law 100-235, dated January 8, 1988.

8. Information Technology Management Reform Act of 1996 (Clinger-Cohen Act), Division E, P.L.104-106, dated February 10, 1996.

9. Government Performance and Results Act of 1993 (GPRA), P.L. 103-162, dated December 1, 1993.

10. Paperwork Reduction Act (PRA) of 1995, P.L. 104-13, dated May 22, 1995.

11. OMB Circular A-130, Management of Federal Information Resources, 61 FR 6428, dated February 20, 1996.

12. Executive Order 13011, Federal Information Technology, signed by the President on July 16, 1996.

13. Government Paperwork Elimination Act (GPEA), Title XVII, P.L. 105-277, dated October 21, 1998.

14. GAO Report, Air Traffic Control: Improved Cost Information Needed to Make Billion Dollar Modernization Investment Decisions, GAO/AIMD-97-20, dated January 1997.

15. GAO Report, Air Traffic Control: Complete and Enforced Architecture Needed for FAA Systems Modernization, GAO/AIMD-97-30, dated February 1997.

16. White House Commission on Aviation Safety and Security, Final Report to the President, dated February 12, 1997.

17. Federal CIO Council, Federal Enterprise Architecture Framework, Version 1.1, dated September 1999.

APPENDIX 3: OPERATIONAL REPORTING RELATIONSHIPS BETWEEN KEY DATA MANAGEMENT FUNCTIONS

This chart depicts the operational reporting relationships between key data management functions in the FAA.