

ORDER

1370.62

DATA GENERAL COMPUTER AND SOFTWARE STANDARDS



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**DEPARTMENT OF TRANSPORTATION
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FOREWORD

Fulfilling organizational objectives within a framework of fiscal austerity is one of the most pressing challenges confronting agency managers. Within this climate, it is necessary to maintain a constant vigil for cost saving techniques. The standards and guidelines contained in this directive provide genuine opportunities for improving the operation and effectiveness of the agency's automatic data processing (ADP) hardware and software resources.

Standards facilitate the interchange of information between ADP facilities and encourage the sharing of software resources. They promote uniformity in agencywide ADP practices and reduce duplication of resources which contribute toward quantifiable cost savings.

The material covered in this directive is principally the result of discussions with key personnel at various agency ADP facilities. This office wishes to acknowledge the substantial contribution made by many dedicated ADP professionals in the regions, centers, and Washington headquarters.

Finally, this directive should be viewed as a living document. To keep pace with the technological advances characteristic of the computer industry, frequent additions and modifications to this directive will most certainly be necessary. This office welcomes any comments concerning inclusion of additional computer standards.



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CHAPTER 1. GENERAL

1. PURPOSE. This order prescribes standards that apply to the Data General MV/8000 computer facilities and software systems, specifically national systems, that are processed on the Data General MV/8000 computers.

2. DISTRIBUTION. This order is distributed to the division level in Washington, and to the branch level in the regional Management Systems Division, the Data Services Division at the Aeronautical Center, and the Administrative Systems Division at the FAA Technical Center.

3. BACKGROUND. FAA administrative requirements are supported by ADP facilities located at Washington headquarters, the Aeronautical and FAA Technical Centers, and nine regional headquarters. The data processing capability has been enhanced by recent replacing of UNIVAC Spectra 70/35, IBM 1401, UNIVAC 9300, and FOUR-PHASE systems with the dual processor Data General MV/8000 systems. In addition to converting many of the older systems onto the Data General, new software is planned for data base management and word processing. These expanded capabilities respond to the rapidly increasing number of users for each computer system. Requirements are also increasing for additional national systems calling for software exchange between all regions. In an effort to maintain effective centralized management control, orderly inter-region processing and efficient utilization and operation of the new computer systems, it is paramount to establish standardized procedures for the Data General environment.

4. DEFINITIONS.

a. An ADP organization is an organizational element within FAA which is responsible for a number of ADP related services including the design, development and/or maintenance of automated data systems. This is a relative term under which the scope and level of service may vary depending on a particular automated data system. It is possible for an organizational element within FAA to be both an ADP organization and a user organization relative to a particular automated data system if that organization uses the system they designed and developed. The same organizational element within FAA can be considered solely a user organization in relation to another automated data system, because they

- (1) Did not design or develop the system
- (2) Do not maintain the system
- (3) Do supply the input for the system after the system has been implemented.

b. National (data) systems are management information systems meeting any one of the following criteria:

(1) Data from the system is used in more than one office, service region, and/or center or in more than one program.

(2) Output from the system is disseminated nationally to a segment of the aviation public or other government elements.

(3) Input to the system comes from more than one office, service, region, or center; national headquarters of nongovernmental organizations or government agencies; or segments of the public beyond the geographical boundaries of the region.

c. Local (data) systems are all management information systems not included in the definition of national systems. Generally, they still meet one of the following criteria:

(1) A management information system used only for internal management by a single office, service, region, or center.

(2) A management information system used by a single region for operational purposes provided that the data source and dissemination is confined to the geographical jurisdiction of that region.

d. A user organization is an organizational element within FAA which first defines its need for information to be produced by a proposed automated data system and which continues to supply the input and/or the output after the system has been implemented. Usually referred to as the Office of Primary Interest.

5. SCOPE. This order is:

a. Mandatory for the design, programming, implementation and distribution of national automated data systems where applications are processed on Data General mini-systems and are intended primarily to support administrative and management activities. Its coverage includes the operation of the Data General MV/8000 computer and the management of the computer facility.

b. Recommended for local systems utilizing the Data General MV/8000 where applicable.

6.-19. RESERVED.

CHAPTER 2. DATA GENERAL STANDARDIZATION

20. GENERAL APPLICATION. Standards exist to be used. The effort to implement a reasonable standard requires the support of management and associated staff. In developing this order, efforts were made to involve a cross-section of FAA management and technical personnel assigned in the software/hardware areas, application system users, and contractors providing services to the FAA Data General facilities. Standards are becoming increasingly more important as a means of reducing cost and increasing quality of services and products. The primary areas that are addressed by standards defined in this order will be:

a. Operations. Standards will be applied to the general hardware operation, training, as well as the scheduling and operation of national application software systems.

b. Software Management. Standards will be applied to the general design of national software systems which will require user-friendly interfaces, standardized functional procedures, and data base design.

c. User Services. Standards will be applied to areas involving user services to include:

(1) Generation of passwords, and recording of individual identifiers of persons authorized or approved to access Data General computers and associated files.

(2) Processing of user requests for services.

(3) Assistance in resolving hardware/software utilization problems, and ensuring accessibility to systems.

(4) Assistance in acquiring computer literacy.

(5) Procedures for installing national systems at user facilities and follow-up support.

(6) Provision of interfacing to other processing facilities.

d. Configuration Management and System Utilization. Standards will be developed to provide control and management of the Data General facilities with a goal of achieving cost-effective functioning of all of the ADP resources within a continually changing environment.

21. SPECIFIC APPLICATION. Standards defined in this order will apply specifically as follows:

a. Operations. With evolution of systems from the batch oriented environment, to the Data General interactive multiple processing and multiple tasking architecture with increased resources and capacity, standardized procedures must be applied to:

(1) Management of the resources to include disk utilization, software sizing, remote access, maintenance, and problem tracking.

(2) Concurrent run processing requires greater operator awareness and intervention, which in turn will require standard procedures and consistent processing practices inherent in each application system.

b. Software. The standards defined in this order apply to all newly developed national systems. Initial design and program specifications will adhere to specific standardized procedures and requirements. It is recommended that whenever possible, the same standards will be retrofitted to existing systems when conversion or software improvement efforts are undertaken.

22. SELECTION OF STANDARDS. Standards is a dynamic program in which individual standards must be flexible enough to encompass changing technology, be detailed enough to attain cost effectiveness objectives, and be replaced and amended when usefulness is served. In addition to the standards specifically defined in this order, the requirement that additional localized standardization shall be established is implied. These localized standards will never be less than defined minimum requirements.

a. Selection Criteria. Elements to be considered by authors when defining and selecting local standards.

(1) What criteria should the standard meet before implementation begins?

(2) What types of resources are needed to support the standard adequately?

(3) How should the standard be integrated into the organization's practices?

(4) How will the impact of the standard be measured?

(5) What plans are needed for the eventual enforcement, evaluation, and evolution of the standard?

(6) What guidelines should be followed in developing, selecting, or tailoring the standard to maximize the potential for successful implementation?

(7) Is the standard a candidate for agency wide application?

23.-29. RESERVED.

CHAPTER 3. DATA GENERAL DIRECTORY STRUCTURE

30. DESCRIPTION. A directory is a file that catalogs information about other files. Through it, qualified users can easily access files. All directories are connected in a network resembling an inverted tree. The top of this network is the system root directory. Each directory except the system root contains entries for directories and for certain files used by the operating system; it also contains a directory called the User Directory Directory (UDD) which holds an initial directory for each user. A directory entry that points to a file contains the file's name, its access control (ACL) information, and the data necessary to access it. Example of user data files are source files (files produced by a text editor program or the CLI CREATE command), object files (files which the originator has compiled), and executable program files (files output by the LINK utility).

31. NATIONAL SYSTEMS DIRECTORY STRUCTURE.

a. The following Standard applies for establishing Data General directory structure for national systems.

(1) Hierarchy. The hierarchy shall consist of only the User Directory Directory (:UDD), located within the Root (:) directory, with subordinate application directories and files, as defined in this paragraph.

(2) Structure. The User Directory Directory (UDD) level will be named as follows: Region (3 alphabetic characters), followed by the national application designator (2 alphabetic characters) as defined in Order 1370.46D, ADP Standards System Identification. .DIR will be used to designate the UDD level as a directory; e.g., :UDD:ASWFE.DIR. As an option, facilities may link application systems to either the :UDD or the Root (:). The preferred linkage will be the Root (:) to provide access to all systems when users are switched from one CPU to the other and to maintain the desired dual system functionality.

(3) Application Directory. The next level will consist of two Application Production Directories and will be named PROD, and TEST; e.g., UDD:ASWFE.DIR:PROD.

(4) National Systems Directories. Application Directory (PROD, TEST) will have four and only four national system directories. These four directories will be named, PROC, DATA, SOURCE and COPYLIB; e.g., :UDD:ASWFE.DIR:PROD:PROC. The DATA directory may have subordinate INFOS files, if applicable, which will be designated by a suffix of .IX to indicate an indexed file and .IX.DB to indicate the data file; e.g., :UDD:ASEFE.DIR:PROD:DATA:INFOS.IX. An optional directory (VERREL) should be utilized for system development and maintenance tasks prior to release to production directories.

b. National system directories as defined in paragraph 31a.(4) above shall contain the following entries in the respective directory as designated.

(1) PROC. This directory will contain Command Line Interpreter (.CLI) Macros; executable programs (.PR) created by the LINK utility; program symbol table (.ST), Sort/Merge command files (.SRT or .CMD) and any information text created by the SED text editor. End users will only have Read and Execute access to entries in this directory.

(2) DATA. This directory will contain entries for data or parameters needed to execute the object program. INFOS data files will be subordinate to this level. The number of files at this level will be kept to a minimum so as not to compound system implementation and function.

(3) SOURCE. This directory will contain the system source code program and the object code (.OB) created either by the macroassembler or a high-level language compiler, i.e., BASIC or COBOL. This file will not be handed-off to user regions but will remain as part of the originating region's national system structure.

(4) COPYLIB. This directory will contain any common areas or source code file definitions intended to be "COPIED" at compilation time. This directory will also not be released to user regions but remain a part of the originating region's national system structure.

(5) TEST Directory. This directory will replicate the production directory structure PROD and will provide a test environment for development or program modification. The TEST sub-directories will however be allocated less storage than PROD sub-directories and contain only elements necessary for unit and system testing. Access to the TEST directory and its four sub-directories will be controlled by the "Y", "T" and "X" class users (application system analyst and programmers).

(6) Version Release Directory - VERREL (Optional). This directory provides the vehicle through which Team/Task leaders may release approved, new or changed object modules, source code, and copy files to production. Since the support programming staff does not normally have the ability to change the production software modules and is not the personnel responsible for maintaining the integrity of the production environment, this directory set provides the team leader with the ability to release software to a production coordinator who would then perform the actual software installation. The team leader will move the modules in PROC, SOURCE, AND COPYLIB within the test environment to the corresponding directories in the version release directory, VERREL. It will then be the responsibility of the Application Manager to actually install the version release by moving the data sets within the VERREL subdirectories to their counterparts in PROD.

32. NATIONAL SYSTEMS ACCESS CONTROL. Each directory established for Data General MV/8000 processing requires an associated Access Control List (ACL) entry in the system disk directory which verifies who has authorization to access the directory and to what extent. The FAA directory access scheme will be an assigned user name template.

a. User name conventions will be basically constructed of 9 alphabetic characters in the following order representing: the unique agency designator (1 character), the unique region/center identifier (2 characters), the unique system/module identifier (2 characters), the class of user and his/her access capability (1 character), and specific user identifier (3 characters).

b. The user class code is the key to the overall directory access and security control because it not only represents the directory manipulation capabilities authorized for the user, but also identifies his/her functions associated with a given system. Each class of user will have specific capabilities within specific directories or exclusion from specific directories. In addition, each user will have a default ACL that will limit the ability of other classes to access directories or files created by them.

c. Standard user class codes and their associated functions are given in Figure 3-1, User Class Codes/Function.

FIGURE 3-1. USER CLASS CODES/FUNCTION

CLASS CODE	FUNCTION
A	<u>Agency Application Manager.</u> This class user is provided with the ownership of the highest directory and all of the production subordinate directories. Although there may be many different systems for the Agency, this user will be capable of accessing any of the production or release segments of these directories. If an Agency Manager is not assigned, then an Application Manager is required. At least one of the two positions must be occupied.
B	<u>Application Manager.</u> This class user has access to the production directories. This individual would be responsible for installing new software into the production environment and would be essentially a "superuser" for that SPECIFIC application within the agency.
C	<u>Application User - Update.</u> This class user would normally be logged directly into the DATA subdirectory for a specified system. The user has the capability of creating files and updating the database within the DATA directory. The related production PROC directory would be in the user's searchlist but access is limited to read and execute capability.
D	<u>Application User - Query.</u> This class user would be logged directly into the DATA subdirectory for a specific system. The user has the ability to create printer and temporary files, but is limited to read access of the database. Thus, it would not be possible for this user class to alter the application database. The related production PROC directory would be in the user's searchlist but the user would be limited to read and execute capability.
G	<u>"Guest" System Manager.</u> This class is identical to the "M" class explained below. Since they are "visiting" from another MV8000 site, they would not be expected to modify any existing structures or system parameters, but would be free to investigate the headquarters implementation of these.
M	<u>Miscellaneous User.</u> This user class is available for general-purpose use. An example could be when a general technical writer needs access to the system, or when an individual is not assigned to any specific system but is in a "learning" mode.

- T System Test User. This user class provides the Task/Team Leader and any designated support programmer with the ability of replicating the actual production user within the TEST environment. The purpose of this user class and identity is to eliminate the need to "live" test any changes.
- W Word Processing. This is a generalized word-processing class of user who may only use word processing. It is expected that clerical personnel will use this account type.
- X Support Programmer. This user class normally works within their own unique directory. The support programmer has limited access to the TEST subordinate directories since the Task/Team Leader would generally control this. However, the support programmer would retain the ability to read the test database (like a query user) and to invoke software in the TEST:PROC in order to unit test software changes. In addition, the support programmer would have read and execute capability on the PROD:PROC since the use of some "approved" software in the course of testing is required.
- Y Team/Task Leader. This user class would be the owner of the TEST directory and all of its subordinate sub-directories. The Team/Task leader is responsible for conducting the controlled system software to the Application Manager for installation. As a result of the default ACL, this user would have access to all software created by the support programmer.
- Z System Programmer/System Manager. This user class is responsible for the overall directory structure, resource allocation, system access, system/compiler program resolution, and disk space management. In order to respond to the demands of a variety of users, it will be necessary to have general access to all Agency Systems on the regional equipment. Essentially a superuser type class that can perform their functions without the actual use of superuser assignments.

33.-39. RESERVED.

CHAPTER 4. RELEASING NATIONAL SYSTEMS

40. OBJECTIVE. To ensure conformity when releasing national systems from originating region to user region the following standards shall apply.

a. National Systems Transfer. Magnetic tape will be the principal media used to transfer national systems to users and will be created as follows:

(1) Density. 1600 BPI.

(2) Format. 9 Track ASCII in multiples of 512 byte physical blocks (BLOCK I/O) per directory/file.

(3) Labels. A standard ANSI label will be created with the LABEL utility to prepare an ordinary volume of tape. This label will facilitate CLI mount (volume identification required), file protection and automatic MOUNT and DISMOUNT commands.

(4) Tape Documentation. Documentation for each magnetic tape transferring a national system will include a list file of the tape dump and a FILESTATUS of the files being transferred on the tape. The DUMP_II utility returns excellent statistics to satisfy this requirement.

b. File Contents. Directories and files defined for national systems in paragraph 31b.(4) will be transferred from originating regions to user regions as follows:

(1) Application Directory PROD. This directory including the sub-directories PROC and DATA will contain only the production system and be documented completely according to Order 1370.58, Uniform User Guide Documentation Standards. No source code (SOURCE) will be released to user regions.

(2) Application Directory TEST. This directory including the sub-directories PROC and DATA will contain a test system to assist in implementation of the production system. Test run control statements and actual sample input data, along with actual sample output of the executed job will be provided.

(3) Supplemental Documentation SUPP. In addition to standard documentation as required by Orders 1370.53 and 1370.58, information concerning sizing requirements for disks and memory, average processing times, estimated volume of output, and tape usage, will also be provided. Points of contact information for Office of Primary Interest (OPI) originating region, system manager, or analyst/programmer responsible for the system will include names, telephone numbers and any additional information that would be helpful in implementing the system and not covered by any other required documentation. This information may be entered into the SUPP file using the SED EDITOR. The SUPP file will be part of the PROD:PROC directory.

c. Tape layout for transferring a released national system will be created as follows:

```

FILE 1   :UDD: Axxxxm.DIR:PROD:PROC
          (include if applicable) :PROD:PROC:SUPP

          2   :UDD:Axxxxm.DIR:PROD:DATA
          (include if applicable) :DATA:INFOS.IX.DB
                                   :DATA:INFOS.DB

          3   :UDD:Axxxxm.DIR:TEST:PROC

          4   :UDD:Axxxxm.DIR:TEST:DATA
          (include if applicable) :DATA:INFOS.IX
                                   :DATA:INFOS.IX.DB

```

d. National Systems CLI Usage. A production Command Line Interpreter (CLI) macro released with a national system will be described in detail so as to be perfectly clear as to its function and manipulation process. The following macro limitations apply to all released production national systems.

(1) Macros shall not require the SUPERUSER privilege. All accesses to required directories and files must stay within the established directories ACL constraints.

(2) Macros shall not reference the SUPERUSER or SUPERPROCESS attributes to either enable or disable them.

(3) Macros will not dynamically create production run parameter or procedure files, unless they run in the directory where they were created or are submitted to the batch queue.

(4) Macros will not create production run files in the "OP" or "LUTIL" directories. Macros that support a national system will not reside in "LUTIL."

(5) JOB logs or audit files should be subordinate to ambiguous directories defined within the macro or application program except for an application operator log-on. In this case, it is expected that application-related files will reference the operator's dedicated directory.

(6) Explicit tests for error or illegal conditions should be a part of any production released macro.

(7) Any macro modifications to the executors environment e.g., changing a search list or redirecting to another directory must be avoided. PUSH/POP mechanism should be used to save and restore a previous environment if modification cannot be avoided.

e. National Systems Processing Requirements. Explicit processing requirements will be defined by the originating region and will be included in the SUPP file for release. However, certain processing requirements will be the responsibility of the user regions and will not be pre-set or hard-coded by the originating region.

(1) Run time priority will be set by each user region system manager. This priority will be set at a higher value than local systems and consistent with other national systems being processed. Scheduling, processing times, and other operational constraints or conflicts will be resolved by the system manager at the user region and the appropriate national system run priority assigned.

(2) Production printed output for national systems will provide for user region optional banners on cover pages to facilitate local production control procedures.

f. Implementation Requirements. To assist user regions in implementing national systems, the originating region will make available at least one ADP programmer or analyst who is familiar with the system for on-site assistance to provide user training to both user region ADP operations and non-ADP users who will utilize the system. Program patches will not be utilized to effect other than immediate errors which may hinder immediate processing. Program patches or modifications will be distributed as a revised system and will be released according to procedures defined in this chapter. To facilitate implementation, a national system checklist shall be utilized by all receiving facilities to ensure all requirements for releasing national systems have been fulfilled. The checklist is illustrated in Figure 4-1, National Systems Acceptance/Loading Checklist.

41.-49 RESERVED

FIGURE 4-1. NATIONAL SYSTEMS ACCEPTANCE/LOADING CHECKLIST

DATA GENERAL MV-8000

CHECKLIST FOR ACCEPTING/LOADING NATIONAL SYSTEMS SOFTWARE

SYSTEM NAME	SYSTEM OWNER	SOFTWARE OWNER	OFFICE FUNCTIONS SUPPORTED
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

<u>DESCRIPTION</u>	SOFTWARE _____	SYSTEM A/B _____

ORIGINATING ANALYST/PROGRAMMER _____

RELEASE MATERIAL

ACCEPTABLE	UNACCEPTABLE	NON-APPLICABLE	
_____	_____	_____	TRANSFER TAPE CONTAINS ALL NECESSARY FILES.
_____	_____	_____	FILE LIST PROVIDED.
_____	_____	_____	ORDER 1370.53 DOCUMENTATION.
_____	_____	_____	SPECIAL INSTRUCTIONS/REQUIREMENTS PROVIDED (frequency of processing, number of ports, special software)
_____	_____	_____	SIZING REQUIREMENTS PROVIDED FOR CORE AND STORAGE
_____	_____	_____	TRAINING MATERIAL PROVIDED
_____	_____	_____	DIRECTORY STRUCTURE
_____	_____	_____	CLI DOCUMENTATION

LOADING PROCEDURES

COMPLETED	NOT-COMPLETED	NON-APPLICABLE	
_____	_____	_____	IMPLEMENT REQUIRED ACL.
_____	_____	_____	IMPLEMENT REQUIRED SEARCHLIST.
_____	_____	_____	

