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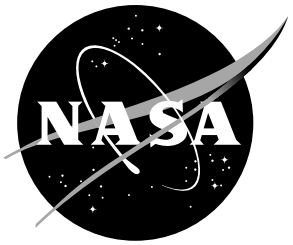

Aviation System Analysis Capability (ASAC) Quick Response System (QRS) Test Report

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SUMMARY

To meet its objective of assisting U.S. industry with the technological challenges of the future, NASA must identify research areas that have the greatest potential for improving the operation of the air transportation system. Therefore, NASA seeks to develop the ability to evaluate the potential impact of various advanced technologies. By thoroughly understanding the economic impact of advanced aviation technologies and evaluating the use of these new technologies in the integrated aviation system, NASA aims to balance its aeronautical research program and help speed the introduction of high-leverage technologies. To meet these objectives, NASA is building an Aviation System Analysis Capability.

NASA envisions the ASAC primarily as a process for understanding and evaluating the impact of advanced aviation technologies on the U.S. economy. ASAC consists of a diverse collection of models, databases, analysts, and other individuals from the public and private sectors brought together to work on issues of common interest to organizations in the aviation community. ASAC will also be a resource, available to those same organizations, to perform analyses; provide information; and assist scientists, engineers, analysts, and program managers in their daily work. With the Quick Response System, a component of the ASAC, ASAC users can quickly collect and analyze aviation data that are resident in the ASAC data repositories.

This document, the *Aviation System Analysis Capability (ASAC) Quick Response System (QRS) Test Report*, presents the results of the QRS Unit and System Tests in support of the ASAC QRS development effort, as defined in the *1995 System Development Plan for the NASA Aviation Systems Analysis Capability (ASAC) Information System* document.

The first section of this document, Introduction, contains an overview of the project background and scope and a definition of the QRS system. It presents this year's additions made to the QRS.

The second section, Test Process and Methodology, includes an explanation of the assumptions, constraints, and approach used to conduct QRS Unit and System Testing. It also presents the QRS testing schedule.

The third section, Test Environment, presents an overview of the Logistics Management Institute (LMI) Test Facility and testing environment. This environment includes external telecommunications and equipment required to test representative client configurations.

The fourth section, Summary of Unit Testing, includes a summary of the QRS Unit Test effort and results. Unit Test Procedures are found in Appendix B.

The fifth section, Summary of System Testing, includes details of the QRS System Test effort and results. System Test Procedures are found in Appendix D.

INTRODUCTION

NASA's Role in Promoting Aviation Technology

The United States has long been the world's leader in aviation technology for civil and military aircraft. During the past several decades, U.S. firms have transformed this position of technological leadership into a thriving industry with large domestic and international sales of aircraft and related products.

Despite its historic record of success, the difficult business environment of the recent past has stimulated concerns about whether the U.S. aeronautics industry will maintain its worldwide leadership position. Increased competition, both technological and financial, from European and other non-U.S. aircraft manufacturers has reduced the global market share of U.S. producers of large civil transport aircraft and cut the number of U.S. airframe manufacturers to only two.

The primary role of the National Aeronautics and Space Administration (NASA) in supporting civil aviation is to develop technologies that improve the overall performance of the integrated air transportation system and, thus, make air travel safer and more efficient and contribute to the economic welfare of the United States. NASA conducts much of the basic and early applied research that creates the advanced technology introduced into the air transportation system. Through its technology research program, NASA maintains and improves the leadership role in aviation technology and air transportation held by the United States for the past half century.

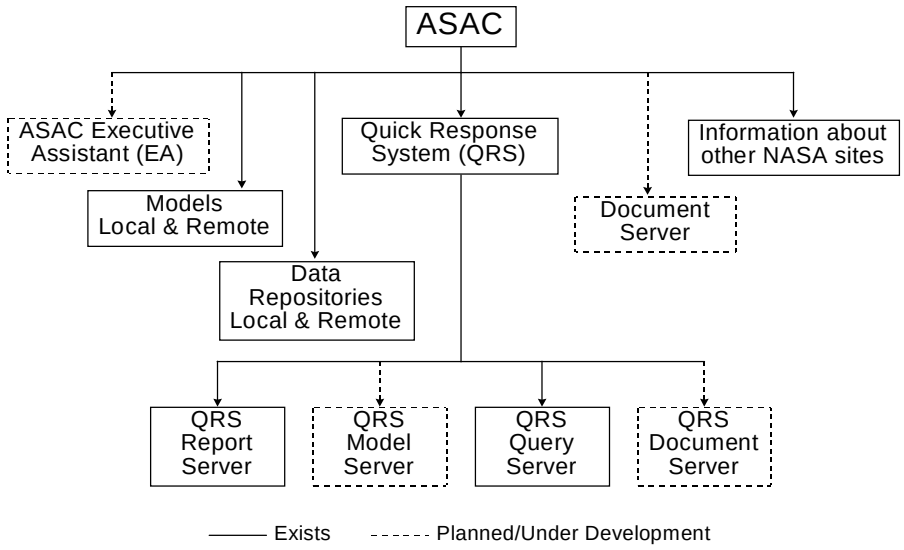
The principal NASA program supporting subsonic transportation is the Advanced Subsonic Technology (AST) program. In cooperation with the Federal Aviation Administration and the U.S. aeronautics industry, the goal of the AST program is to develop high-payoff technologies that support the development of a safe, environmentally acceptable, and highly productive global air transportation system. NASA measures the long-term success of its AST program by its contribution to an increased market share for U.S. civil aircraft and aircraft component producers and the increased effectiveness and capacity of the national air transportation system.

NASA's Research Objective

To meet its objective of assisting the U.S. aviation industry with the technological challenges of the future, NASA must identify research areas that have the greatest potential for improving the operation of the air transportation system. Therefore,

NASA must develop the ability to evaluate the potential impact of various advanced technologies. By thoroughly understanding the economic impact of advanced aviation technologies and evaluating the use of new technologies in the integrated aviation system, NASA can balance its aeronautical research program and help speed the introduction of high-leverage technologies. To meet these objectives, NASA is building ASAC. The components of ASAC are shown in Figure 1.

Figure 1. ASAC System Components



NASA has asked LMI to design a prototype of the ASAC Quick Response System. The prototype provides an interface from NASA personnel to selected databases and reports to support NASA goals. In this document, we address the content and unit and system testing of the QRS.

ASAC QRS

QRS Description

The QRS will comprise four system components:

- QRS Report Server
- QRS Model Server

- QRS Query Server
- QRS Document Server.

Authorized users can access the QRS at http://www.asac.lmi.org/access/index.html by using a forms-capable World Wide Web (WWW) browser such as Netscape Navigator or NCSA Mosaic.

QRS Report Server

With the QRS Report Server, users can generate reports from information stored in the ASAC data repository. Over eighty reports are available from the following seven categories:

1. Airport data
2. Carrier data
3. Equipment data
4. Flight segment data
5. Jet engine data
6. Origin and destination data
7. Miscellaneous (includes airport and carrier codes)

Ninety reports are currently available from the QRS Report Server. The initial beta release of the QRS included 79 reports. The balance of the reports were added this year so that users could access data that were added to the ASAC Data Repositories. They were also added because of the results of a functional analysis that compared the initial QRS report list with the requirements defined in *Short-Term Data Manipulations and Displays for the ASAC Information System NS301-01*.

The eleven reports added this year are listed in Table 1.

Table 1. New QRS Reports

Report Name	Report Title
B43-CA1	B43 Aircraft Inventory—Distribution of Aircraft (for a given carrier)
B43-EQ1	B43 Aircraft Inventory—Distribution of Carriers (for a given equipment code)
OAG-AP3	ASAC Airport Departures Forecast—Equipment Level (sorted by aircraft type)
OAG-CA3	Equipment-Specific Operational Data for a Given Carrier (ranked by revenue passenger miles)
OAG-CA4	Airport-Specific Operational Data for a Given Carrier (ranked by revenue passenger miles)
OD-AP5	Origin & Destination—Airport Totals (ranked by outbound domestic passenger revenues)
OD-CT1	Origin & Destination—City Totals (ranked by ratio of inbound to outbound initiated trips)
OD-CT2	Origin & Destination—City Totals (ranked by O & D matrix enplaned passengers)
OD-CT3	Origin & Destination—City Totals (ranked by ratio of O & D to T-3)
OD-CT4	Origin & Destination—City Totals (ranked by sum of inbound and outbound international passengers)
OD-CT5	Origin & Destination—City Totals (ranked by outbound domestic passenger revenues)

In addition to adding new reports, we modified existing reports to allow access to new data. A complete list of QRS reports and their last revision dates are included in Appendix C.

QRS Model Server

At present, six models are available from the QRS Model Server. The models are listed in Table 2.

Table 2. Content of ASAC Model Repositories

Model	Operating System	Comment
ASAC Air Carrier Investment Model—Second Generation	Windows (Excel, Version 5.0) Macintosh (Excel, Version 5.0)	Available as a standalone model from the QRS Model Server
ASAC Air Carrier Network Cost Model	HP-UX 10.20	Available via a WWW interface
ASAC Airport Capacity Model	HP-UX 10.20	Available via a WWW interface
ASAC Airport Delay Model	HP-UX 10.20	Available via a WWW interface
ASAC Flight Segment Cost Model (Cost Translator)	HP-UX 10.20	Available via a WWW interface
ASAC Flight Segment Cost Model (Mission Generator)	HP-UX 10.20	Available via a WWW interface

QRS Query Server

Using the QRS Query Server, a user can query the following information that is stored in the ASAC data repository:

- Airport code
- Airport location
- Airport name
- Airport rundown
- Bearing between airports
- Carrier code
- Carrier name
- Distance between airports
- Equipment code
- Equipment name.

QRS Document Server

The fourth component, the QRS Document Server, will host such QRS related documents as *ASAC QRS Report Server User's Guide*, LMI Report NS601RD1.

ASAC DATA REPOSITORIES

ASAC data repositories support the QRS and its components. New data sources and additional years of existing data were added to the ASAC Data Repositories this year. A link to data source descriptions can be found on the QRS home page. At the present time, approximately 1.8 gigabytes of data reside in the ASAC Data Repositories. The data that currently reside in the data repositories are shown in Table 3.

Table 3. Content of ASAC Data Repositories

Data Source	Years of data in repository	Years of data added to the repository this year
DOT Airline Service Quality Performance (ASQP)	1993 and 1995	1995
DOT Form 41 Financial	1989–1994	1994
DOT Origin and Destination Matrices	1989–1994	1994
DOT Schedule B-43 Airframe Inventory	1994	1994
DOT T-100 Flight Segment	1989–1994	1994
DOT T-3/T-100 Airport Rank	1989–1994	1994
FAA Noise Certification	1996	1996
FAA Terminal Area Forecast (TAF)	1976–1994 Historical 1995–2010 Forecast	1976–1994 Historical 1995–2010 Forecast*
Official Airlines Guide (OAG) North American and Worldwide Merge Files	1993	—
World Jet Inventory	1993 and 1995	1995

*Replaced existing TAF data in the data repository with new TAF data.

The Data Repository disk configuration, as well as the QRS Database Entity Definition, QRS Database Attribute Definitions, QRS Database Physical Device Allocation, and QRS Database Segment Usage information, is included in Appendix A.

QRS HIGH-LEVEL DESIGN

The ASAC QRS system has two distinct design components.

1. QRS Applications, including the following:

    a Graphical User Interface (GUI) in the form of Internet WWW Pages

    b. Report Specification Program

    c. Report Generation Program

    d. Report Viewer for UNIX/X Window Systems

2. ASAC Relational Database Management System (RDBMS).

From a design perspective, the QRS Applications support the four system components of the QRS system—the Report, Model, Query, and Document Servers, and the ASAC RDBMS is the vehicle for maintaining the ASAC Data Repositories. Figure 2 depicts the high level design of the QRS.

Figure 2. QRS High Level Design

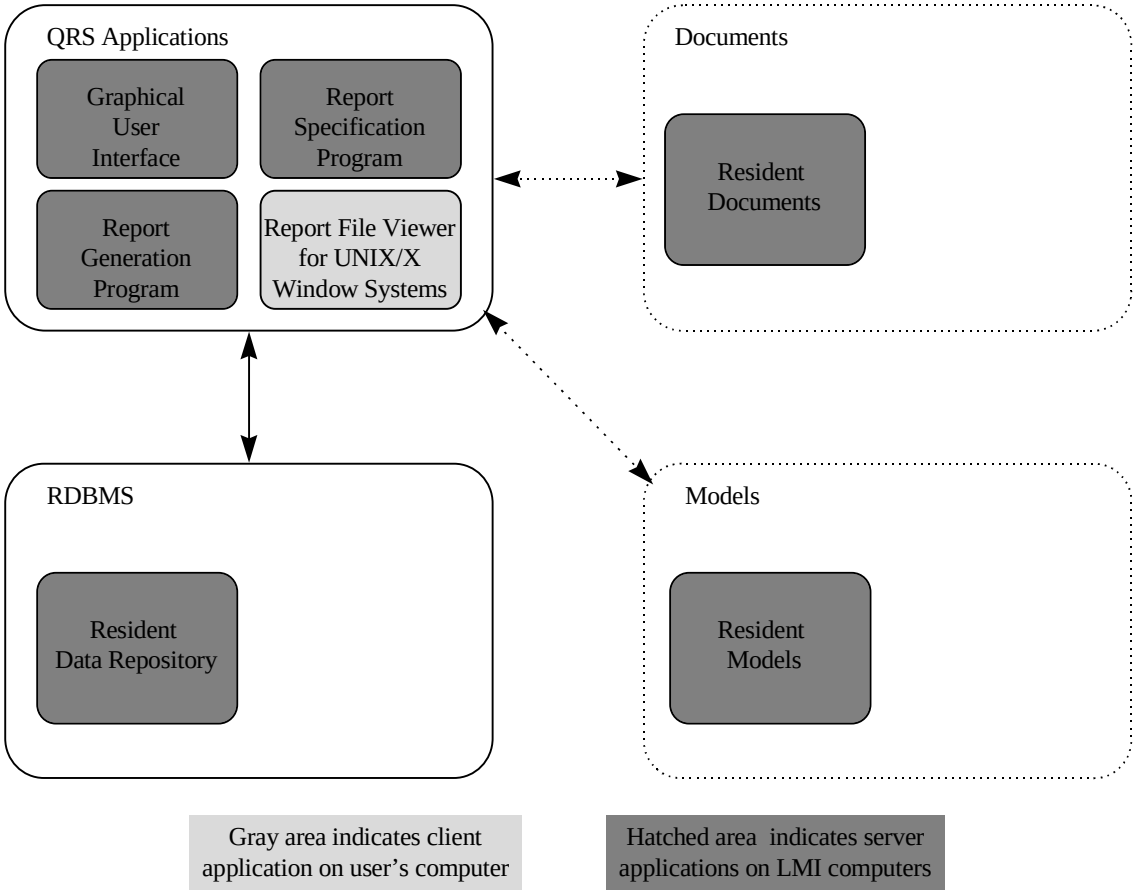


Table 4. QRS Design and System Component Relationships

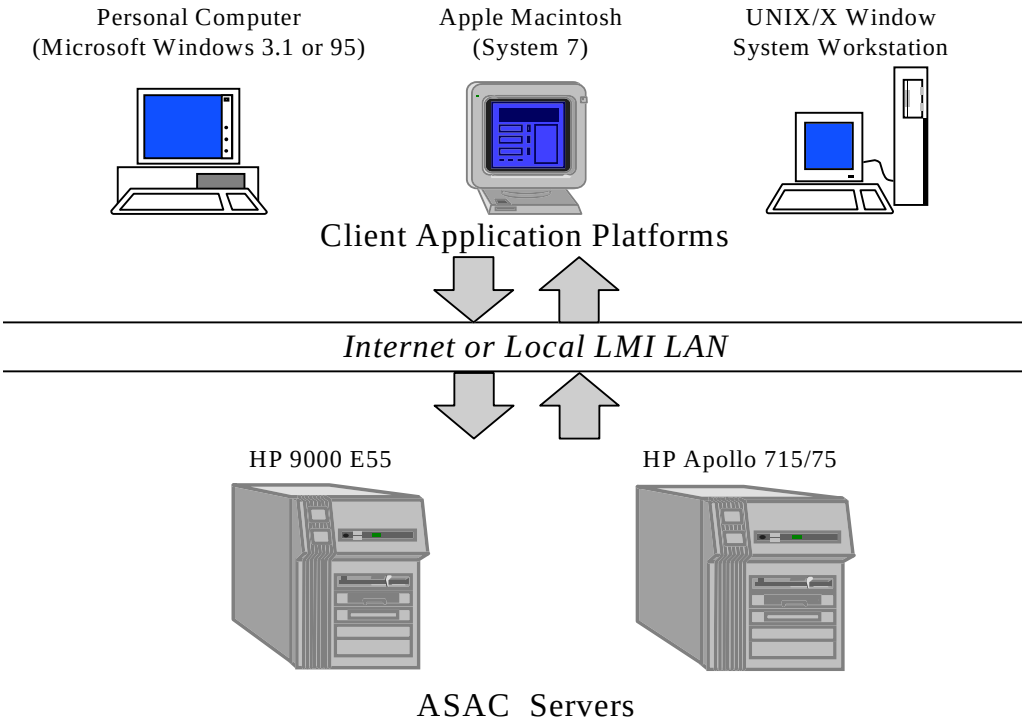
QRS Design Component	QRS System Component
QRS Applications	
GUI	Used by the Report, Model, Query, and Document Servers
Report Specification Program	Used by the Report Server
Report Generation Program	Used by the Report Server
Report Viewer	Used by the Report Server
RDBMS	
Resident Data Repositories	Used by the Report and Query Servers
Models	
Resident Models	Available through the Model Server
Documents	
Resident Documents	Available through the Document Server

The ASAC QRS system is implemented with a client/server architecture. The QRS applications reside locally on the client's workstations and on HP (UNIX-based) servers located at LMI. The QRS client application runs under the following environments:

- Microsoft Windows 3.1
- Microsoft Windows 95
- Apple Macintosh System 7
- UNIX/X Window Systems
  - HP-UX v9.0 or above
  - SunOS v5.4 or above
  - SGI IRIX v5.3 or above

The ASAC servers host the ASAC RDBMS and the QRS applications. The user can access the ASAC servers through an Internet connection or LMI Local Area Network (LAN) connection. The high-level QRS hardware configuration is illustrated in Figure 3.

Figure 3. QRS Hardware Configuration



TEST PROCESS AND METHODOLOGY

This section describes the test process and methodology used for QRS unit and system testing. The following elements define the QRS unit and system tests:

- Test assumptions
- Test constraints
- Test goals
- Test scenarios
- Test execution
- Test report
- Test schedule.

Test Assumptions

In conducting QRS unit and system testing, we made the following assumptions:

- Only LMI personnel will use the Report Specification Program.
- Users will use a Hypertext Mark-up Language (HTML) forms interface (e.g., a Web browser such as Mosaic or Netscape) to access the Report Generation Program through the ASAC WWW Site . The user will provide client Internet access as well as the HTML forms interface.
- LMI will maintain the ASAC WWW Site.
- UNIX users are responsible for downloading and installing of the appropriate ASAC Report Viewer for UNIX/X Window Systems on their equipment. The ASAC Report Viewer for UNIX/X Window Systems is currently available for the following UNIX systems:
  - Silicon Graphics, Inc. (SGI)
  - Hewlett-Packard (HP)
  - Sun Microsystems, Inc.
- Microsoft Windows 3.1, Windows 95, and Macintosh System 7 users will provide Microsoft Excel version 5.0 or later in order to view reports generated by the Report Generation Program.
- The ASAC Report Viewer for UNIX/X Window Systems views text files as generated and sent by the Report Generation Program. If users edit the received text file(s), the Report Viewer may not be able to read the file(s).
- The Report Viewer for UNIX/X Window Systems is intended for files generated by the Report Generation Program only. It is not a general purpose file viewer or spreadsheet program.
- The ASAC QRS software and hardware will be under version control during testing.
- The user will provide the e-mail software required to receive reports generated by the Report Generation Program.

Test Constraints

We conducted QRS unit and system testing under the following constraints:

- LMI will test common user configurations. However, because of resource and time constraints, we will not test all potential user configurations. Configurations used for testing are listed in the next section, Test Environment.

Test Goals

The goals of QRS unit and system testing are to assess the functionality, interoperability, and performance of the ASAC QRS system. We used these goals to define the tests, scenarios, and criteria. We also used the goals to evaluate test results.

FUNCTIONALITY GOAL

Assess the functionality of ASAC QRS hardware and software according to the *ASAC QRS Functional Description*.

INTEROPERABILITY GOAL

Demonstrate the interoperability of the ASAC QRS with external entities, including the Internet and client hardware and software.

PERFORMANCE GOAL

Evaluate the performance of ASAC QRS hardware and software in transactions with internal and external entities.

Test Scenarios

Test scenarios describe the procedures performed to assess the functionality, interoperability, and performance of the ASAC QRS system. We designed the tests so that we could evaluate one or more goals in a single test.

Test Execution

All personnel participating in the ASAC QRS System Test recorded observations and measurements on the appropriate test procedure. Completed test procedures are located in Appendices B and E.

We wrote problem reports (PRs) for each test anomaly or failure. The PRs generated during testing are tracked in a PR database. The list of problem reports and their current disposition is located in Appendix E.

Retest

Retest of anomalies or failures documented during testing occurred in a retest period. Upon successful resolution and verification of a problem, we closed the corresponding PR as "fix verified."

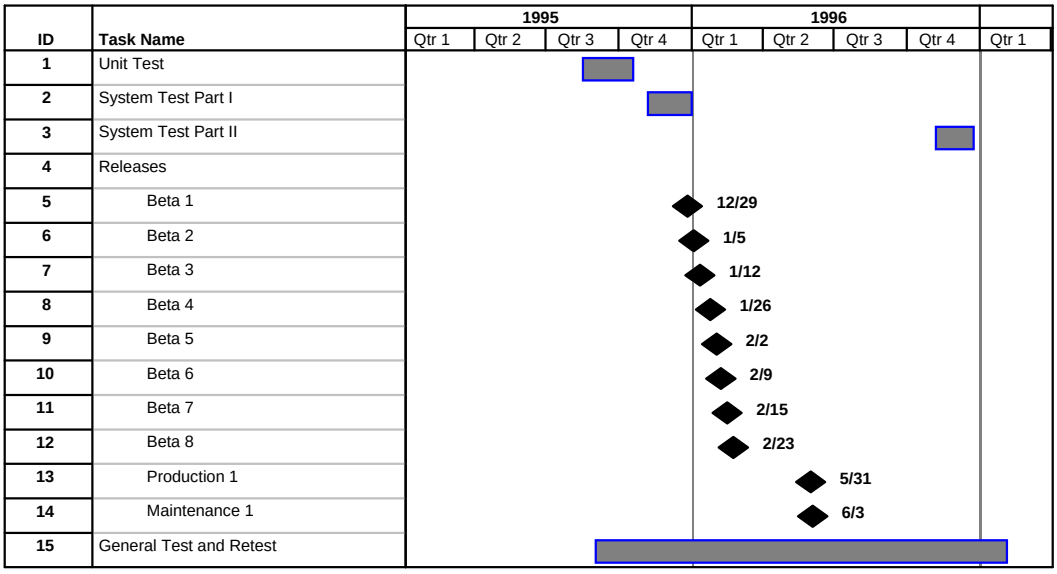
Test Report

We will produce the ASAC QRS Test Report by compiling information from the executed unit and system test procedures.

Test Schedule

We conducted QRS unit testing from 14 August 1995 through 16 October 1995. We conducted QRS system testing from 6 November 1995 through 29 December 1995 and from 5 November 1996 through 20 December 1996. We conducted general testing and retest during the above test periods and throughout 1996. The QRS test schedule is depicted in Figure 4.

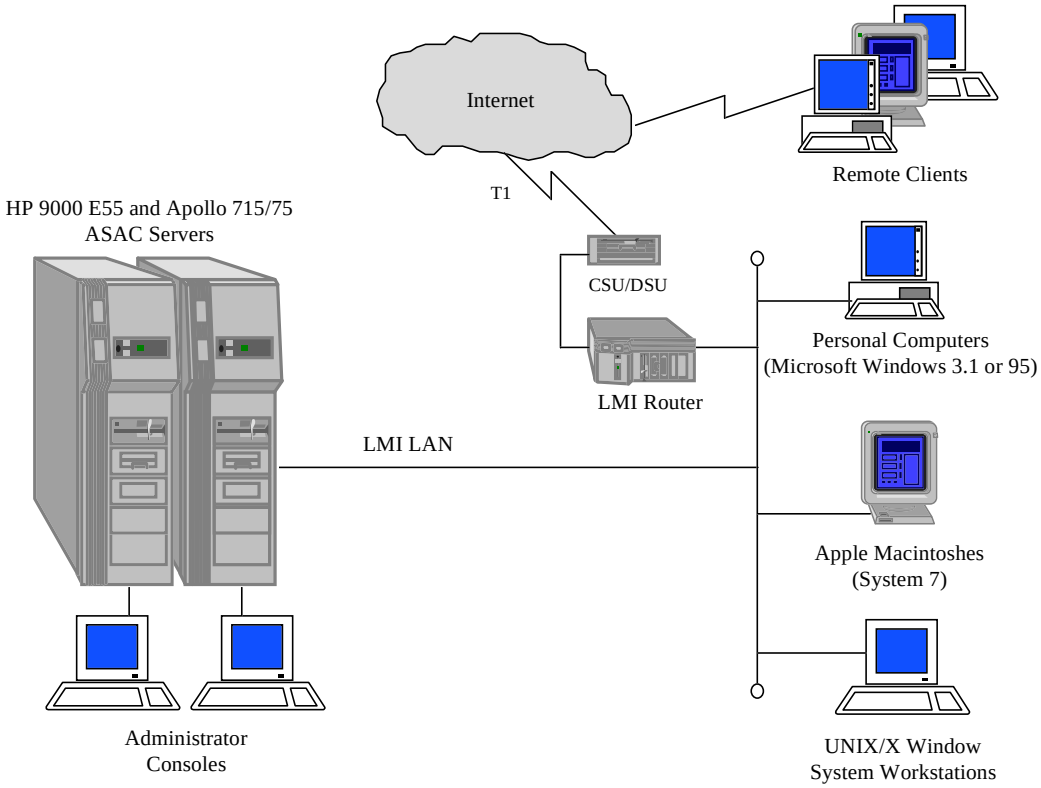
Figure 4. QRS Test Schedule



TEST ENVIRONMENT

The LMI ASAC QRS test facility is located at 2000 Corporate Ridge, McLean, Virginia. The facility has been engineered for the development, testing, and operation of ASAC QRS components. The facility contains a LAN that provides interoperability between development and test clients and the ASAC server. Internet connectivity provides access to the ASAC WWW site from remote clients. The LMI ASAC test facility is depicted in Figure 5.

Figure 5. LMI QRS Test Configuration



Server Configurations

HP APOLLO 715/75

The HP Apollo 715/75, depicted in Figure 6, is a UNIX workstation that functions as the ASAC WWW Server. We chose the HP Apollo as the WWW Site server because, as a UNIX workstation, it has built-in Transmission Control Proto-

col/Internet Protocol (TCP/IP) networking capability (the Internet is based on TCP/IP).

The HP Apollo hosts the QRS applications (WWW Site, Report Generation, and Specification Programs) and the Report Viewer for UNIX/X Window Systems, which is available for download to client platforms. The HP Apollo currently functions as the ASAC QRS development environment and consists of the following components:

Hardware

1. HP Apollo 715/75 with:
    a. 64 Megabyte (MB) Random Access Memory (RAM)
    b. 75 Megahertz Intel 680XX processor
2. Three 1 Gigabyte (GB) Disks (user space)
3. One 2 GB Disk (user space)
4. One 1 GB Disk (swap space)
5. Small Computer Systems Interface (SCSI) Adapter (supports up to seven devices)
6. Ethernet Adapter Cables
7. One Administrator Console
8. One Uninterruptable Power Supply (UPS) (with Powerchute software)
9. One 2 GB tape backup
10. One CD-ROM drive

Software

1. HP-UX version 9.05
2. X Window System version 11 release 5 (X11R5)
3. Open Software Foundation (OSF) Motif version 1.2

4. C compilers

    a. cc (HP-UX standard C compiler)

    b. CC (HP-UX C++ compiler)

    c. Free Software Foundation, Inc. GNU C Compiler (American National Standard Institute (ANSI) compatible)

5. Pascal compiler

6. National Center for Supercomputing Applications (NCSA) hypertext transfer protocol daemon (httpd) for UNIX (ASAC QRS WWW Site software)

7. ASAC QRS Report Generation Program

8. ASAC QRS Report Specification Program

9. Report Viewer for UNIX/X Window Systems.

10. Practical Extraction and Reporting Language (Perl) 5.002 interpreter.

HP 9000 E55

The HP 9000 E55, also depicted in Figure 6, is a UNIX workstation that hosts the ASAC RDBMS. It consists of the following components:

Hardware

1. HP 9000 E55 with:

    a. 128 Megabyte (MB) Random Access Memory (RAM)

    b. 96 Megahertz processor

2. Two 1 Gigabyte (GB) Disks (user space)

3. Six 1 GB Disks (data segment)

4. Small Computer Systems Interface (SCSI) Adapter (supports up to seven devices)

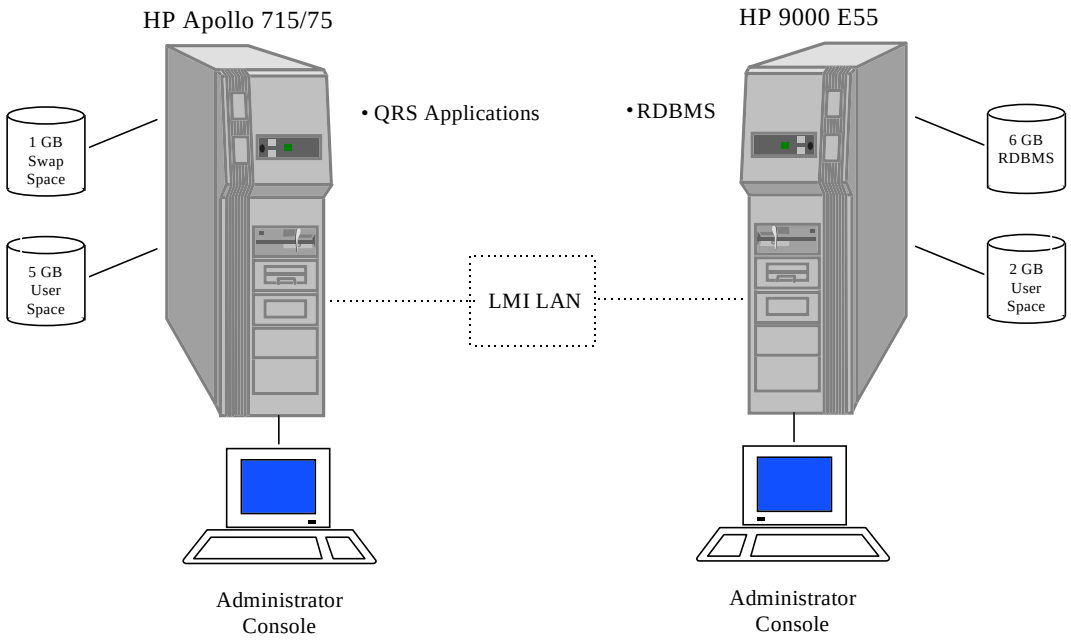
5. Ethernet Adapter Cables

6. One Administrator Console
7. One Uninterruptable Power Supply (UPS)
8. One 2 GB tape backup
9. One CD-ROM drive

Software

1. HP-UX version 10.2
2. X Window System version 11 release 5 (X11R5)
3. Open Software Foundation (OSF) Motif version 1.2
4. C compilers
    a. cc (HP-UX standard C compiler)
    b. CC (HP-UX C++ compiler)
    c. Free Software Foundation, Inc. GNU C compiler (ANSI compatible)
    d. Free Software Foundation, Inc. GNU C++ compiler (ANSI compatible)
5. Sybase System 11 (RDBMS)
6. Perl 5.002 Interpreter.

Figure 6. ASAC Server Configurations



Client Configurations

We conducted ASAC QRS unit and system testing on platforms that are internal and external to the test facility. Commercial-off-the-shelf (COTS) hardware and software used for development and testing is described below:

PERSONAL COMPUTER

Personal Computer 1

Hardware

- Compaq Deskpro 486/66I attached to LMI LAN.

Software

- Windows version 3.1
- Novell TCP/IP Transport version 2.4

- Excel version 5.0
- Lotus cc:Mail version 2.21
- Netscape Navigator™ version 1.1N

Personal Computer 2

Hardware

- Compaq Deskpro XL5120 attached to LMI LAN.

Software

- Windows 95
- Novell TCP/IP Transport version 2.4
- Excel version 7.0
- Lotus cc:Mail version 6.0
- NCSA Mosaic™ for Microsoft Windows version 2.0 Final Beta "The Comet".

Personal Computer 3 (remote)

Hardware

- Gateway 2000 Pentium 90
- 28000 baud modem

Software

- Windows 95
- Excel version 7.0
- Netscape Navigator™ version 3.01 Gold.

APPLE MACINTOSH

Macintosh 1

Hardware

- Macintosh IIci attached to LMI LAN.

Software

- MacTCP
- Excel version 4.0
- Netscape Navigator™ version 2.02

Macintosh 2

Hardware

- Power Macintosh 7100/66 attached to LMI LAN.

Software

- MacTCP
- Excel version 5.0
- Netscape Navigator™ version 2.02

UNIX/X WINDOW

UNIX Workstation 1

Hardware

We used the following X stations and X terminals to develop and test the ASAC QRS system:

- Two ENVIZEX X stations
  - Intel i960 Reduced Instruction Set Computer (RISC) processor

- 6 MB memory

- Four ENTRIA X terminals
  - Intel i960 RISC processor
  - 4 MB memory.

Software

- Software resident on HP Servers
- Report Viewer for UNIX/X Window Systems.

UNIX Workstation 2 (remote)

Hardware

- SGI Indy IP22 located at NASA Ames Research Center (hercules.arc.nasa.gov).

Software

- IRIX version 5.3
- Report Viewer for UNIX/X Window Systems.

UNIX Workstation 3 (remote)

Hardware

- Sun SPARCStation 2.0 located at the Pennsylvania State University Center for Electronic Design, Communications, and Computing (cedcc.psu.edu).

Software

- SunOS version 5.5
- Report Viewer for UNIX/X Window Systems.

LAN Configuration

The LAN used to support ASAC QRS testing is the internal LMI LAN. LAN hardware and software used by the QRS include the following:

- Kentrox D-SERV Channel Service Unit/Data Service Unit (CSU/DSU).
- T1 leased line Wide Area Network (WAN) backbone.
- Cisco IGS Multiprotocol Router/Bridge.
  - Network connection—10 Mbps Ethernet capability using 10BaseT twisted pair cabling
  - Leased line Internet feed—high speed serial ports connect to CSU/DSU.
- Multiple network servers hosting the following network operating systems
  - Novell Netware 3.11
  - Novell Netware 4.1
  - Microsoft NT 3.51.

Clients have direct access to the ASAC Servers through the Internet. Clients use an HTML forms interface such as Netscape or Mosaic Web browsers to access the ASAC WWW QRS Site. Reports requested by the client are transmitted to the client over the Internet in the form of an e-mail message or downloaded by the client through file transfer protocol (ftp). The client uses either Excel (for Microsoft Windows and Macintosh System 7 users) or the ASAC Report Viewer for UNIX/X Window Systems (for UNIX users) to view the requested report.

Test Tools

All UNIX code developed for the QRS was compiled using Insure++, an automatic runtime compiler, from ParaSoft Corporation. Insure++ automatically detects large classes of programming and run-time errors, algorithmic anomalies, bugs, and deficiencies. Two add-on components, Inuse and Total Coverage Analysis (TCA) were also used. Inuse visualizes in real-time the memory manipulation of a program, a functionality that helps discover bugs and inefficiencies

in memory handling. TCA performs coverage analysis of programs and provides necessary feedback about which parts of the code were actually tested.

Insure++ finds a wide variety of programming and memory access errors including the following:[1]

- Memory corruption because of reading or writing beyond the valid areas of global, local, shared, and dynamically allocated objects
- Operations on uninitialized, NULL, or "wild" pointers
- Memory leaks
- Errors allocating and freeing dynamic memory
- String manipulation errors
- Operations on pointers to unrelated data blocks
- Invalid pointer operations
- Incompatible variable declarations
- Mismatched variable types in printf and scanf argument lists.

Insure++ also finds library interface errors including the following:

- Mismatched argument types or function declarations
- Out of range or otherwise invalid arguments in library calls
- Errors returned by library calls.

Inuse, the dynamic memory visualization tool, displays the following:

- Statistics regarding the amount of dynamic memory in use
- Memory fragmentation
- Sizes of allocated blocks
- The number of calls to memory management routines.

[1] ParaSoft Corporation, “Insure ++ Overview.”

TCA, the coverage analysis module, shows the following:

- Which parts of the code were tested
- How much code was tested
- How many times different code blocks were executed.

SUMMARY OF UNIT TESTING

We conducted unit testing for the QRS from 14 August 1995 through 16 October 1995. The QRS comprises the following components:

- Graphical User Interface in the form of Internet WWW Pages
- Report Specification Program
- Report Generation Program
- Report Viewer for UNIX/X Window Systems.

Graphical User Interface

The GUI is provided by a commercial WWW browser, such as Netscape Navigator or NCSA Mosaic. The WWW pages developed for the QRS do not lend themselves to unit testing. The WWW pages were tested extensively as part of the QRS system testing.

QRS Report Specification Program

OVERVIEW

With the ASAC QRS Report Specification Program, a report author can validate and insert a report specification into the Report Specification Database. A report specification contains all of the elements of a report. Report elements include the report title, report filename, Standard Query Language (SQL) statements (to extract data from the database), report column headings, report column definitions, and report totals. The report specification exists in a report specification file and is written in the report specification language (refer to *the Design Document for Report Specification Program* for additional information). The Report Generation Program will create the report.

TEST OBJECTIVE

The goal of this unit test was to exercise fully all validation rules enforced by the QRS Report Specification Program and properly insert a valid report into the Report Specification Database. We tested the following invalid conditions: no input file, file too long, like too long, no sections, .END before .BEGIN, empty section, intertwined definitions, two line filename, filename too long, illegal filename, filename exists, report title too long, bad headings, bad total descriptions, bad totals, bad columns, and bad password. We also tested a valid report specification file.

TEST PREPARATION

We created a report specification file for each of the invalid conditions. A report specification file containing illegal titles, filenames, headings, columns, etc., was also created for the tester's use.

TEST PROCEDURE

The Test Procedure, *Unit Test Procedures for Report Specification Program*, is located in Appendix B.

TEST RESULTS SUMMARY

We successfully completed all of the procedures contained in the *Unit Test Procedures for Report Specification Program*. The Report Specification Program properly validated invalid report specifications and accepted valid report specifications. Valid report specifications were then stored in the Report Specification Database.

QRS Report Generation Program

OVERVIEW

The ASAC QRS Report Generation Program uses a report specification stored in the Report Specification Database, executes the report's SQL statements, and builds a report compatible with either Microsoft Excel or the ASAC QRS Report Viewer for UNIX/X Window Systems.

TEST OBJECTIVE

The goal of this unit test was to exercise fully the QRS Report Generation Program and verify correct behavior on a server error condition. The invalid conditions tested were: first argument not slk (Excel) or dat (UNIX/X Window), the report does not exist, error in .PRE section of SQL, error in .RESULT section of SQL, error in .POST section of SQL, and .PRE,.POST, and .RESULT sections do not occur in proper order. WE also tested error free reports in both the slk and dat formats.

TEST PREPARATION

A number of reports were created and stored in the database for use by the tester. We created the reports for each of the invalid conditions and error conditions returned from the server as the result of an incorrect SQL statement.

TEST PROCEDURE

The Test Procedure, *Unit Test Procedures for Report Generation Program*, is located in Appendix B.

TEST RESULTS SUMMARY

We successfully completed all of the procedures contained in the *Unit Test Procedures for Report Generation Program.* The Report Generation Program properly generated correct reports and properly handled error conditions.

QRS Report Viewer for UNIX/X Window Systems

OVERVIEW

The X Window System Report Viewer (xrview) is designed so that users can view reports generated by the ASAC QRS Report Generation Program on a UNIX workstation running the X Window System and OSF/Motif 1.2. The Report Viewer displays the report file data in a read-only spreadsheet format.

TEST OBJECTIVE

The objective of the unit test is to demonstrate that the program starts and terminates normally, the command line and menu options all operate correctly, the program accurately loads and displays syntactically correct data files, and that certain syntax errors in the data files are handled adequately.

TEST PREPARATION

We will create data files to exercise each of the unit test procedures. We use a syntactically correct data file to test correct operation while incorrect files are used to test handling of data errors. We use correct files that emphasize the particular operation to test specific functionality, such as arithmetic operation and formatting.

TEST PROCEDURE

The Test Procedure, *ASAC QRS X Window System Report Viewer Unit Test Procedures*, is located in Appendix B.

TEST RESULTS SUMMARY

Test results for each procedure are documented in the test procedure located in Appendix B. At the conclusion of the test and retest, all test procedures involving valid data files passed. Certain procedures involving invalid data files failed and were not fixed because of the high improbability that these errors will occur in generated data files.

SUMMARY OF SYSTEM TESTING

We conducted system testing for the ASAC QRS from 6 November 1995 through 29 December 1995 and again from 5 November 1996 through 20 December 1996. The first system test session tested the pre-beta release version of the QRS; the second system test session tested the current production version of the QRS.

We conducted general testing of the system on an ad-hoc basis (upon completing new reports, adding new data, and as a result of day-to-day system use) throughout 1996.

Numerous test procedures were written for QRS system testing. They are summarized in Table 5.

Table 5. Summary of QRS System Tests

Test Procedure	Test Procedure Title
RDBMS	
RDBMS001	QRS Database Analysis
RDBMS002	QRS Database Validity
RDBMS010	QRS Report Specification Database Analysis
RDBMS011	QRS Report Specification Database Validity
RDBMS020	Database Access
RDBMS030	RDBMS Concurrent Users
QRS	
QRS001	WWW Presentation and Editorial Consistency
QRS002	WWW Page Operation
QRS010	Report Specification Program Functionality—Windows
QRS020	Report Generation Program Functionality—Macintosh
QRS030	Report Viewer Download and Installation—HP
QRS031	Report Viewer Functionality—HP
QRS033	Report Viewer Download and Installation—Sun
QRS034	Report Viewer Functionality—Sun
QRS035	Report Viewer Download and Installation—SGI
QRS036	Report Viewer Functionality—SGI
System Information	
SI001	Help/Informational Text Accuracy
SI020	Error/Information/System Message Functionality
SI030	User Access, System Log Procedures and Validity
Administrative	
MBR001	Server Maintenance Mode
MBR002	System Recovery

RDBMS

OVERVIEW

The RDBMS product used for ASAC is Sybase System 11. Functionality of Sybase will not be tested because Sybase is a mature, widely used COTS product. The RDBMS contains two databases.

1. ASAC QRS Database

2. ASAC QRS Report Specification Database.

The ASAC QRS Database is a relational database that contains data from the Official Airline Guides (OAG), the U.S. Department of Transportation (DOT), Terminal Area Forecast (TAF), and other sources. The database is accessible to users through the ASAC Report Specification and Generation Programs. The QRS Database diagram is located in Appendix A.

The ASAC QRS Report Specification Database is a relational database that contains report specifications developed to extract data from the ASAC QRS Database. The database is accessible to users through the ASAC Report Specification and Generation Programs. The QRS Report Specification Database diagram is located in Appendix A.

TEST OBJECTIVE

The following four tests will be performed for each database:

1. Database Analysis
2. Database Validity
3. Database Access.

In addition, we will conduct an RDBMS concurrent user test.

Database Analysis

We will conduct desktop analysis of the ASAC QRS Database and ASAC QRS Report Specification Database to validate the database model.

Database Validity

We will use the SQL tool provided with the Sybase System 11 RDBMS to perform queries on the databases. The queries shall be performed to verify that

- each field in every table is populated with data and
- data are in the expected format (e.g., date, time, integer).

Database Access

We will verify that database access is limited to the ASAC system administrator, other approved personnel, and the Report Specification and Generation Programs.

Concurrent Users

The Sybase System 11 is used as the ASAC Information System RDBMS. For this application, Sybase System 11 is licensed for up to 8 concurrent users. We will verify the system response if more than 8 concurrent users attempt to access the Sybase database at one time.

TEST PREPARATION

Both databases were populated with data and given appropriate permissions.

TEST PROCEDURE

We created six test procedures of the RDBMSXXX series for RDBMS testing. The completed test procedures are located in Appendix D.

TEST RESULTS SUMMARY

We successfully completed all procedures described in this section.

QRS

OVERVIEW

The QRS comprises the following components:

- GUI in the form of Internet WWW Pages
- Report Specification Program
- Report Generation Program
- Report Viewer for UNIX/X Window Systems.

WWW Site

We used NCSA httpd software to create the ASAC WWW Site. The WWW Site Home Page is currently available to NASA personnel and provides information on ASAC Steering Committee meetings, the LMI Air Carrier Investment Model, and other related topics. The Home Page also provides links to other NASA sites. Only ASAC QRS functionality to the WWW Site will be tested as part of system testing.

Report Specification Program

With the Report Specification Program, an LMI report author can create a report by specifying the data selection and layout of information contained in the ASAC QRS Database. The report specifications are stored in the ASAC Report Generation Database. LMI has created numerous reports, which are available under the

ASAC QRS Query and Report Tool service located on the ASAC WWW Site Home Page. Available reports are listed in Appendix C.

Report Generation Program

The Report Generation Program

- takes a report format previously created by the Report Specification Program and stored in the ASAC Report Specification Database and either
  - runs a query on the ASAC RDBMS based on user parameters entered in a ASAC WWW Page and generates a report, or
  - retrieves a previously generated report from the ASAC server.

The generated spreadsheet file is in one of the following two formats:

- .SLK for PC/Windows or Macintosh systems
- .DAT for UNIX systems.

On the basis of user requests, the spreadsheet file will be available to the user by

- e-mail to the user's default or specified e-mail address, or
- posting to the anonymous ftp directory for user download.

The user use either Excel or the Report Viewer for UNIX/X Window Systems to view the file.

Report Viewer for UNIX/X Window Systems

With the ASAC Report Viewer for UNIX/X Window Systems, the UNIX system user can view (read-only) a report from ASAC in a spread-sheet like manner. The user can also save the file in a comma-delimited or tab-delimited format so that the file can be imported into other programs.

TEST OBJECTIVE

WWW Site

Verify that the QRS pages added to the ASAC WWW Site are consistent in presentation with the established pages. Check for editorial clarity and consistency of all new items and existing items.

Verify that the operation of the pages is as expected, e.g., moving between pages, selecting items, and entering data.

Report Specification Program

Accuracy and Consistency

Ensure all reports listed above are available on the WWW site. Ensure all reports on the WWW site have a defined report in the ASAC Report Specification Database. Ensure all specified fields are listed on the appropriate WWW Page and are provided with each report.

Report Generation Program

Functionality

- Request at least one instance of each report. Ensure report is generated correctly for given input variables. Ensure all columns are as expected. Ensure data in each column are valid, e.g., no divide by zero or cell reference errors. Ensure data in each column are realistic.
- Ensure report is generated in the user specified format (Excel or UNIX/X Window System Report Viewer).
- Ensure data fill-in areas and user selections function as expected. Verify ability to change or cancel requests before sending report request.
- Verify e-mail address is pre-filled with the correct e-mail address.
- Verify help text is clear, informative, and covers all relevant topics.
- Ensure reports are sent to the correct e-mail address or stored for download with a message containing the correct file name sent to the correct e-mail address.
- Ensure files can be downloaded via ftp.
- Perform the above listed items for all major user platforms (Windows, Macintosh, UNIX).

Report Viewer for UNIX/X Window Systems

- Test user download of file viewer. Ensure that various file viewer formats are clearly indicated and that the user receives the correct format.
- Install the file viewer. Test installation instructions, determine potential user issues, etc.
- Test the functionality of the file viewer. Compare results of the file view to files viewed using Excel. Ensure calculations performed by the file viewer are accurate by comparing results to results obtained for same calculations using Excel.
- Test the functionality of commands available with the file viewer. Ensure instructions for using the commands are clear, accurate, and complete.
- Ensure files saved in comma-delimited and tab-delimited formats are correctly saved in the specified format.
- Perform the above listed items for all supported UNIX platforms (SGI, HP, and Sun).

TEST PREPARATION

Ensure all QRS reports and WWW pages are complete and operational.

TEST PROCEDURE

We created ten test procedures of the QRSXXX series for QRS testing. The completed test procedures are located in Appendix D.

TEST RESULTS SUMMARY

We successfully completed all procedures described in this section.

System Information

OVERVIEW

System information provides information or direction to the user. System information is composed of the following:

- Help and informational text
- Error, information, and system messages.

TEST OBJECTIVE

Help/Informational Text

Ensure help and informational text is clear, accurate, and complete. Ensure minimum system requirements for each supported platform are included.

Error, Information, and System Messages

Validate Report Generation Program error handling, e.g., invalid user specified e-mail address, invalid or improper length data.

Validate system response due to user error, e.g., no e-mail address, invalid e-mail address, incorrect file viewer commands, etc.

Validate returned messages due to a server problem, database problem, report generation problem, communication problem.

Server Time-out

NCSA httpd provides a TimeOut directive for the WWW Site server. TimeOut specifies the maximum time allowed between sending or receiving successive data packets. If a problem occurs with data transmission between a client and the WWW Site server, e.g. the data stream is interrupted, the server will TimeOut and abort the connection.

- Verify TimeOut is set to accommodate all connections, e.g. slower dial-up links (default is 30 seconds).
- Verify connection aborts on TimeOut.
- Verify TimeOut occurrence is logged in the Error Log file.

TEST PREPARATION

Ensure help and informational text is incorporated in the QRS system, and that hypertext links and error processing are activated.

TEST PROCEDURE

We created three test procedures of the SIXXX series for System Information testing. The completed test procedures are located in Appendix D.

TEST RESULTS SUMMARY

We successfully completed all the procedures described in this section.

Administrative

OVERVIEW

Using the administrative functions, the system administrator can secure, protect, and maintain the QRS. Administrative functions consist of the following:

- Security
- Logs
- Maintenance, backup, and recovery
- Version control.

TEST OBJECTIVE

Security

User id and password will restrict access to the WWW site. Access is granted on a directory basis by the server configuration.

Server Access—User Authorization

Examine the following directives in the WWW Site server configuration file to ensure password protection is enforced:

- AuthType
- AuthName
- AuthUserFile
- AuthGroupFile
- Require (in a Limit section)

Attempt WWW Site server access using valid and invalid id/password combinations.

Server Access Administration

Ensure add and delete of user id and password functions properly. Ensure passwords are encrypted on the server.

Password Administration

Ensure requesting a new password and changing a password function correctly.

Logs

Ensure procedure exists to periodically compress, inspect, and archive the log files listed below.

Verify the ASAC Server Usage log report accurately reflects server usage and selected information from the Access Log.

Access Log

Information contained in the Access Log includes the following:

- Address of the client that requested the document
- Date and time the transfer took place

- Hypertext transfer protocol (HTTP) method and protocol used for the transfer
- Virtual path to the document transferred
- Status of the transfer
- Number of bytes transferred.

The following data can be calculated:

- Busiest hours of the day, days of the month, etc.
- Total volume of byte traffic (and percentage of connection bandwidth) for any given time period.

Error Log

The ErrorLog directive specifies the location of the file that records server errors, including the following:

- Documents that could not be found
- Timeouts due to slow communication links
- Connections that have been interrupted
- Script errors
- Database errors
- Invalid configuration files.

Test to ensure the following failures are correctly recorded:

- Client denied by server
- File does not exist
- Timeouts.

Maintenance

Hardware

To keep the ASAC system in optimum condition, we will perform hardware maintenance on a manufacturer recommended schedule. The ASAC server may not be available while server maintenance is being performed.

Verify message when system is in maintenance mode.

Software

All COTS software products will be protected by a current maintenance agreement with the appropriate software manufacturer. COTS software will be updated or upgraded as required. The COTS software changes should not have an impact on the functionality of the ASAC system.

Backup

We perform incremental tape backups on the ASAC Server once per week and a full backup of the ASAC Server monthly. Tapes are stored off-site in a secure, fireproof location.

An uninterrupted power source (UPS) protects the ASAC server against short term (less than 30 minutes) power outages. The ASAC server does not contain mission- or life-critical components; therefore, We will not take any redundancy measures to ensure continuity in the event of a long term power outage or equipment malfunction.

Recovery

Verify ability to recover from hardware failures, etc. Verify ability to restore server from backup tapes.

Version Control

All software will be under version control upon successful completion of ASAC QRS unit testing. Upon successful completion of system testing, we will lock all software and assign a version number according to established version control procedures.

We will not test functionality of the COTS software used to perform version control.

TEST PREPARATION

Ensure the httpd server software is active and components of the software are configured for QRS use. Ensure server backup software and revision control software are installed.

TEST PROCEDURE

We created two test procedures of the MBRXXX series for administrative testing. The completed test procedures are located in Appendix D.

TEST RESULTS SUMMARY

We successfully completed all procedures described in this section.

CONCLUSION

During the past year, we successfully completed QRS unit and system testing. In addition to testing, eleven new reports, three new data sources, plus additions to existing data sources and reports, were added to the QRS.

Since QRS's initial beta release in December 1995, numerous representatives from NASA, the FAA, Universities, and commercial entities have used the QRS to support NASA's research goals.

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Groff, James R. and Paul N. Weinberg. *LAN Times® Guide to SQL*. Osbourne McGraw-Hill, 1994

Orfali, Robert, Dan Harkey, and Jeri Edwards. *Essential Client/Server Survival Guide*. John Wiley & Sons, Inc., 1994

ParaSoft Corporation. "Insure++ Overview," http://www.parasoft.com/insure/basic.htm, January 1997

OTHER APPLICABLE DOCUMENTS

Internal LMI documents applicable to ASAC QRS Unit and System Testing include:

- 1995 System Development Plan for the NASA Aviation Systems Analysis Capability (ASAC) Information System
- ASAC Information System (Phase I) Functional Description
- ASAC Information System Configuration Management and Revision Control System (RCS) Process
- ASAC QRS X Window System Report Viewer (xrview) Unit Test Plan
- ASAC Report Viewer for UNIX/X Window—Design Document
- ASAC Report Viewer for UNIX/X Window—Functional Description
- Design Document for Report Generation Program
- Design Document for Report Specification Program
- Functional Description of Report Specification and Report Generation Programs
- Short-Term Data Manipulations and Displays for the ASAC Information System NS301-01

- Unit Test Plan for the ASAC QRS Report Generation Program
- Unit Test Plan for the ASAC QRS Report Specification Program

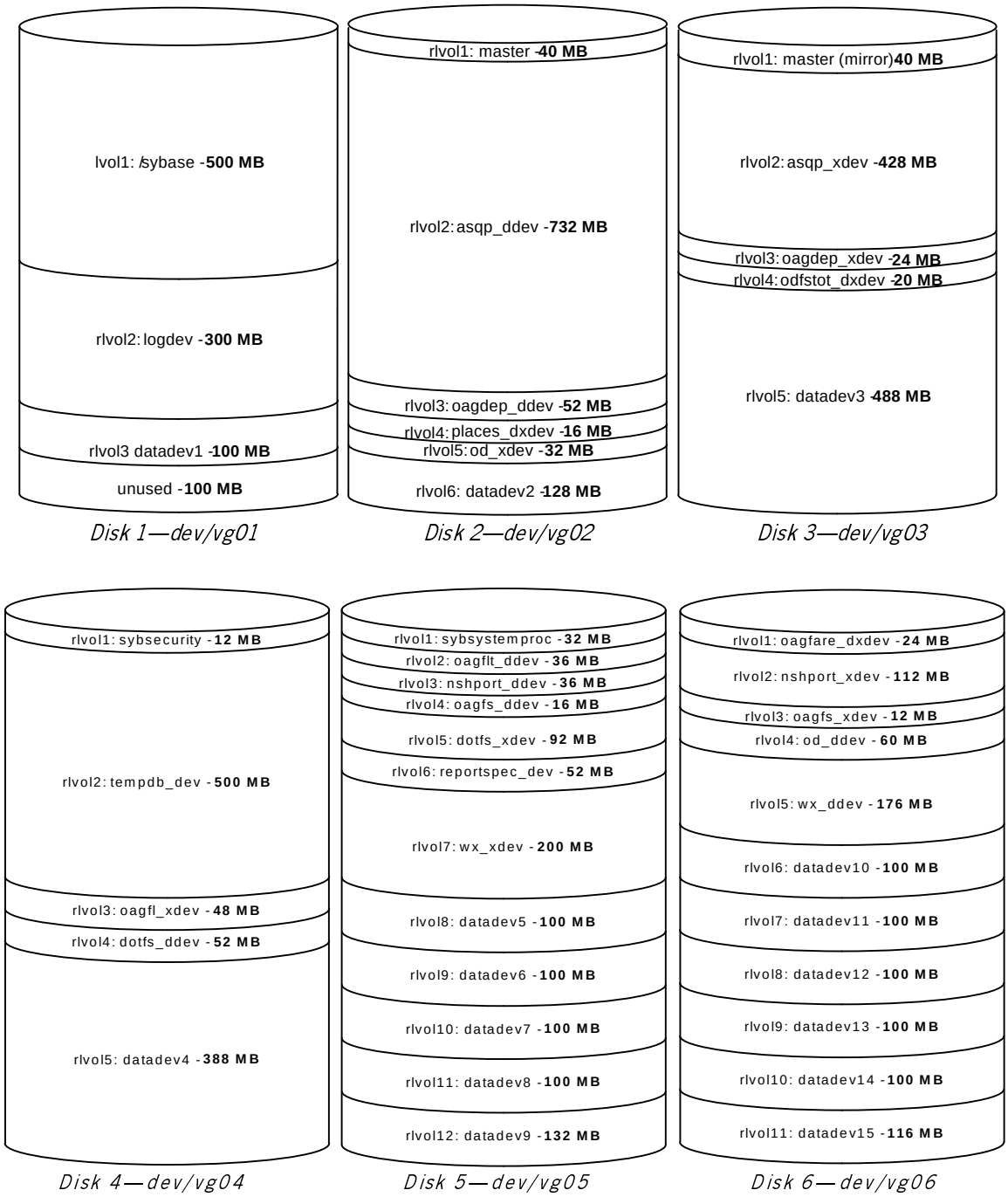
Appendix A
Database Descriptions

This appendix contains the following information:

- Data Repository Disk Configurations
- QRS Database Entity Definitions
- QRS Database Attribute Definitions
- QRS Database Physical Device Allocation
- QRS Database Segment Usage
- QRS Database Entity-Relationship Diagram
- Report Specification Database Entity-Relationship Diagram.7.

DATA REPOSITORY DISK CONFIGURATIONS

Figure A-1. Data Repository Disk Configurations



QRS DATABASE ENTITY DEFINITIONS

Table A-1. QRS Database Entity Definitions

Entity Name	Entity Definition
Airport inventory	Boeing's Year-End World Jet Airplane Inventory
Aircraft model type	Aircraft Equipment Model Type (Jet, Propeller, etc.)
Airline entity	This table lists the airline entity types.
Airline operator	This table correlates operators that operate airlines with those airlines.
Airport	This table describes individual airports by DOT airport code and airport name. It correlates with the OAG city/airport codes.
Airport city	This table correlates OAG city code and airport number with the FAA airport code for that airport.
Airport distance	This table shows the great circle distance between two airports.
Airport rank	This table describes the airport rank data for individual airports.
ASQP airport total	This table contains rolled-up airport data for ASQP-reportable flights. This data has been extracted from the ASQP_FLIGHT_SCHEDULE table.
ASQP flight schedule	This table describes the schedule and delay data for ASQP-reportable flights.
ASQP flight segment total	This table contains rolled-up (derived) data from the ASQP_FLIGHT_SCHEDULE table.
B43 Inventory	B43 Aircraft Inventory
Balance sheet	This table describes the balance sheet for an airline.
Calendar	Perpetual calendar table. Holds 14 possible calendar permutations.
Calendar ID	Assigns calendar Ids based on the day of the week of New Year's Day and if a year is a leap year or not.
City	This table correlates city, state, US region, country, and DOT city code with the OAG city code.
Code sharing airline	Some airlines share codes for certain ranges of flight numbers. These airlines and the flight number ranges are described in this table.
Days	This table relates the names of the days of the week with the identifier used in the OAG to specify when flights are scheduled.
DOT aircraft model	This table describes individual aircraft models by manufacturer, model number, and series name. The Code is supplied in the DOT Data (Form 41/Database Products).
DOT airline	This table gives the DOT codes for airlines listed in Form 41 Data. These codes may differ from the OAG codes, even for the same airline. This table also contains the airline group number (1,2, or 3) and type (Scheduled or Other).
DOT Flight segment data	This table describes the data for a flight segment between 2 cities for a particular year and month, airline, and aircraft model.
DOT Place	This table contains the DOT codes for airports and cities.
Employee count	This table describes the employee count for airline entities.
Engine	This table describes aircraft engines by model and manufacturer.
Group 1 operating costs	Form 41 P-5.1 equipment-specific operating expenses for group I airlines by entity.
Group 2 & 3 operating costs	Form 41 P-5.2 equipment-specific operating expenses for group II and III airlines by entity.
Manufacturer	This table describes airplane and engine manufacturers.
Months	Month names, numbered sequentially.
OAG Aircraft model	This table describes individual aircraft models by manufacturer, model number, and series name. The identifying code is supplied in the Official Airline Guide.
OAG Airline	This table gives the OAG codes for airlines listed in the OAG. These may differ from the DOT codes, even for the same airline.
OAG Airport data	Fifteen minute time series of OAG departures and arrivals.

Table A-1. QRS Database Entity Definitions (Con't.)

Entity Name	Entity Definition
OAG Flight departure	This table identifies which days of the week a flight from the OAG FLIGHT table is scheduled to depart.
OAG Flight expectations	Exceptions to OAG flight schedules. Exceptions are coded as EX, for excluded dates and OP for operating dates.
OAG Flight fare class	This table correlates the fare classes available on an individual flight with the flight.
OAG Flight segment data	This table contains calculated data on flight segments according to data from the OAG FLIGHT table. This table contains separate rows where two airlines share the same flight segment. OAG NON-SHARED FLIGHT SEGMENT DATA contains the same data but with
OAG Non-shared flight segment data	This table contains calculated data on flight segments according to data from the OAG FLIGHT table. This table contains only one row where two airlines share the same flight segment. OAG FLIGHT SEGMENT DATA contains the same data but with each airline
OAG Noshare Airport data	Fifteen minute time series of OAG departures and arrivals, not counting code-sharing flights.
OAG Place	The OAG combines city and airport codes into a common table, making them indistinguishable. This table contains those codes. The CITY and AIRPORT tables relate here to get the city or airport name.
OD Airport total	Rollup totals for Origin and Destination airport data elements
OD Flight segment total	Rollup totals for Origin and Destination flight segment data elements
Operator	This table describes organizations which operate flights. These organizations may or may not be airlines. The type of operator is described in OPERATOR_TYPE.
Operator type	Describes types of operators as airlines, governments, etc.
Origin and destenation	Data for all origin and destination pairs defined among the top 200 U.S. airports (with outbound specified as direction) starting with CY 1993 and working backwards for 5 years.
Profit and loss	Form 41 P-1.1 summary profit and loss statement for Group I airlines by entity. Form 41 P1.2 summary profit and loss statement for Group II and III airlines by entity.
Retired world area	This table contains retired world area codes and their replacement codes.
TAF Data	Constant Terminal Area Forecast (TAF) data for airports (does not vary year to year).
TAF Operations	Variable Terminal Area Forecast (TAF) data for airports. This table contains forecast data for each airport by year, based on the base year found for the corresponding airport in TAF_DATA.
TAF Place	This table contains the TAF codes for airports and cities.
TAF US Region	Describes US regions for US cities as used in TAF data.
TAP weather	Hourly Terminal Area Productivity weather data for 10 major airports, 1961-1995
Traffic	Form 41 T-2 equipment-specific traffic data by airline and entity.
US State	Contains names of US states keyed by two-letter abbreviations.
World area	Describes world areas as used by OAG data.
World area group	Defines grouping (roughly by continent) of World Area Codes.
Year	Associates a year with its correct entry in the perpetual calendar table.

QRS DATABASE ATTRIBUTE DEFINITIONS

Table A-2. QRS Database Attribute Definitions

Entity Header	Attribute Name	Attribute Definition	Domain	Primary Key	Foreign Key	Other Index	NULL Allowed
AIRCRAFT INVENTORY	sys_oper_num	System Generated Operator ID	Numeric Id	✓	✓		
	sys_engine_num	System Generated Engine ID Number	Numeric Id	✓	✓		
	dot_model_cd	DOT Equipment Model Code	Equipment Code	✓	✓		
	craft_inven_series_nm	Equipment Series Name that defines this model	Name	✓			
	craft_inven_yr	Aircraft Inventory Data Year	Year	✓			
	craft_inven_cnt	Aircraft Inventory Count	Item Count				✓
	craft_inven_num_eng_type	Aircraft Inventory Number Engines Type (number of engines in free-text form) Exists to relieve ambiguity of DOT_MODEL_CD 999	Num Engine Type				✓
AIRCRAFT MODEL TYPE	sys_model_type_num	System Generated Aircraft Model Type Number	Numeric Id	✓			
	model_type_nm	Aircraft Model Type Name	Name				✓
AIRLINE ENTITY	entity_dot_cd	Carrier Entity DOT identifier code	Entity	✓			
	entity_nm	Carrier Entity name	Name				
AIRLINE OPERATOR	sys_oper_num	System Generated Operator ID	Numeric Id	✓	✓		
	airline_oag_cd	OAG Carrier Code	Airline Code		✓		✓
	airline_dot_cd	DOT Carrier Code	Airline Code		✓		✓
AIRPORT	sys_port_num	System Generated Airport ID Number	Numeric Id	✓			
	dot_place_cd	DOT Place Code (Airport or City)	DOT Place Code		✓		✓
	oag_place_cd	OAG Place Code (Airport or City)	OAG Place Code		✓		✓
	taf_place_cd	TAF Airport Code	TAF Place Code		✓		✓
AIRPORT CITY	sys_city_num	System Generated City ID Number	Numeric Id	✓	✓		
	sys_port_num	System Generated Airport ID Number	Numeric Id	✓	✓		
AIRPORT DISTANCE	dist_dest_port_cd	DOT Place Code (Airport or City)	DOT Place Code	✓	✓		
	dist_orig_port_cd	DOT Place Code (Airport or City)	DOT Place Code	✓	✓		
	dist_distance	Great circle distance in statute miles between the two airports	Distance				
AIRPORT RANK	dot_place_cd	DOT Place Code (Airport or City)	DOT Place Code	✓	✓		
	rank_data_yr	Year for which data was taken	Year	✓			
	rank_all_sched_depart	T-3 total scheduled departures	Item Count				✓
	rank_all_sched_enplaned_pass	T-3 total scheduled enplaned passengers	Item Count				✓
	rank_dom_aircraft_miles	T-100 domestic US aircraft miles	Item Count				✓
	rank_dom_avail_seat_miles	T-100 Domestic U.S. Available seat miles (in 1000s)	Long Item Count				✓
	rank_dom_enplaned_pass	T-100 domestic US enplaned passengers	Item Count				✓
	rank_dom_onboard_pass	T-100 domestic US onboard passengers	Item Count				✓

Table A-2. QRS Database Attribute Definitions (Con't.)

Entity Header	Attribute Name	Attribute Definition	Domain	Primary Key	Foreign Key	Other Index	NULL Allowed
	rank_dom_rev_pass_miles	T-100 Domestic U.S. Revenue passenger miles (in 1000s)	Long Item Count				✓
	rank_dom_sched_depart	T-100 domestic US scheduled departures	Item Count				✓
	rank_port_rank_num	Airport Rank Number	Rank				
ASQP AIRPORT TOTAL	port_total_port_cd	DOT Place Code (Airport or City)	DOT Place Code	✓	✓		
	port_total_data_yr	ASQP Data Totals - data year	Year	✓			
	port_total_arrive_cnt	ASQP Data Totals - airport arrivals	Item Count				✓
	port_total_depart_cnt	ASQP Data Totals - total departures	Item Count				✓
	port_total_delay_arrive_sum	ASQP Data Totals - sum of arrival delays	Item Count				✓
	port_total_delay_depart_sum	ASQP Data Totals - sum of departure delays	Item Count				✓
	port_total_taxi_in_sum	ASQP Data Totals - sum of taxi-in times	Item Count				✓
	port_total_taxi_out_sum	ASQP Data Totals - sum of taxi-out times	Item Count				✓
ASQP FLIGHT SCHEDULE	flt_oag_num	OAG Flight Number; matches flt_oag_num in OAG FLIGHT	Flight Number	✓		✓	
	airline_dot_cd	DOT Carrier Code	Airline Code	✓	✓		
	asqp_orig_port_cd	DOT Place Code (Airport or City)	DOT Place Code	✓	✓	✓	
	asqp_dest_port_cd	DOT Place Code (Airport or City)	DOT Place Code	✓	✓	✓	
	asqp_depart_dt	Flight departure date	Date	✓		✓	
	asqp_act_arrive_tm	Actual Flight Arrival Time	Time				✓
	asqp_act_depart_tm	Actual Flight Departure Time	Time				✓
	asqp_act_elapse_min	Actual Elapsed Flight Time (in minutes)	Elapsed Time				✓
	asqp_airborne_min	Time (in minutes) that flight is airborne	Elapsed Time				✓
	asqp_crs_sched_arrive_tm	CRS Scheduled Flight Arrival Time	Time				✓
	asqp_crs_sched_depart_tm	CRS Scheduled Flight Departure Time	Time				✓
	asqp_crs_sched_elapse_min	CRS Scheduled Elapsed Flight Time (in minutes)	Elapsed Time				✓
	asqp_delay_arrive_min	Arrival Delay (in minutes)	Elapsed Time				✓
	asqp_delay_depart_min	Departure Delay (in minutes)	Elapsed Time				✓
	asqp_delay_flight_min	Flight Time Delay (in minutes)	Elapsed Time				✓
	asqp_oag_sched_arrive_tm	OAG Scheduled Flight Arrival Time (should be the same as OAG flight data, but may differ because of different source)	Time				✓
	asqp_oag_sched_depart_tm	OAG Scheduled Flight Departure Time (should be the same as OAG flight data, but may differ because of different source)	Time				✓
	asqp_tail_num_id	Tail Number identifier of aircraft	Short Name				✓
	asqp_taxi_in_min	Amount of time (in minutes) spent in moving from the landing runway to the arrival gate	Elapsed Time				✓

Table A-2. QRS Database Attribute Definitions (Con't.)

Entity Header	Attribute Name	Attribute Definition	Domain	Primary Key	Foreign Key	Other Index	NULL Allowed
	asqp_taxi_out_min	Amount of time (in minutes) spent in moving from the departure gate to the takeoff run-way	Elapsed Time				✓
	asqp_wheels_off_tm	Local time when aircraft left the runway during takeoff	Time				✓
	asqp_wheels_on_tm	Local time when aircraft touched the runway during landing	Time				✓
ASQP FLIGHT SEGMENT TOTAL	seg_total_orig_port_cd	DOT Place Code (Airport or City)	DOT Place Code	✓	✓		
	seg_total_dest_port_cd	DOT Place Code (Airport or City)	DOT Place Code	✓	✓		
	seg_total_data_yr	ASQP Flight Segment Data Totals - data year	Year	✓			
	seg_total_flight_cnt	ASQP Flight Segment Data Totals - total flight count	Item Count				✓
	seg_total_delay_flight_sum	ASQP Flight Segment Data Totals - sum of flight delays	Item Count				✓
	seg_total_act_elapse_sum	ASQP Flight Segment Data Totals - sum of actual flight block times	Item Count				✓
B43 INVENTORY	b43_data_yr	Year of B43 Inventory Data	Year	✓			
	b43_owner_type	Ownership type - relationship of owning airline to aircraft. CL - Capital Lease OL - Operating Lease OW - Owned Aircraft UN - Unknown	Ownership Type Code	✓			
	b43_serial_num_id	Serial Number of Aircraft	Short Name	✓			
	dot_model_cd	DOT Equipment Model Code	Equipment Code	✓	✓		
	airline_dot_cd	DOT Carrier Code	Airline Code		✓		✓
	b43_first_del_yr	Year Aircraft was first delivered	Year				✓
	b43_noise_cat_num	Noise Category (Stage) number	Noise Category				✓
	b43_seat_cnt	Number of seats on aircraft	Item Count				✓
	b43_tail_num_id	Tail number of aircraft	Short Name				✓
BALANCE SHEET	airline_dot_cd	DOT Carrier Code	Airline Code	✓	✓		
	bal_data_yr	Balance Sheet Data Year	Year	✓			
	bal_curr_assets	Current assets	Money				✓
	bal_curr_liabilities	Current liabilities	Money				✓
	bal_def_credits	Deferred credits	Money				✓
	bal_net_stock_equity	Net stockholders equity	Money				✓
	bal_non_curr_liabilities	Non-current liabilities	Money				✓
	bal_oper_prop_equip	Operating property & equipment	Money				✓
	bal_total_assets	Total assets	Money				✓
CALENDAR	sys_month_num	System Generated Month ID (1=January … 12=December)	Month ID	✓	✓		
	cal_day	Calendar Day	int	✓			
	cal_id_num	Calendar ID Number	Calendar ID	✓	✓		
	day_oag_cd	OAG Code for day of the week (1=Monday … 7=Sunday)	Day ID		✓		
CALENDAR ID	cal_id_num	Calendar ID Number	Calendar ID	✓			
	new_yrs_day_cd	OAG Code for day of the week (1=Monday … 7=Sunday)	Day ID		✓		
	cal_id_leap_yr	TRUE if type represents a leap year	Boolean				
CITY	sys_city_num	System Generated City ID Number	Numeric Id	✓			
	city_nm	City Name	Name				

Table A-2. QRS Database Attribute Definitions (Con't.)

Entity Header	Attribute Name	Attribute Definition	Domain	Primary Key	Foreign Key	Other Index	NULL Allowed
	city_state_cd	World Area Code for US State or Canadian province that city is in	World Area Code		✓		✓
	city_country_cd	World Area Code for country that city is in	World Area Code		✓		
	dot_place_cd	DOT Place Code (Airport or City)	DOT Place Code		✓		✓
	oag_place_cd	OAG Place Code (Airport or City)	OAG Place Code		✓		✓
CODE SHARING AIRLINE	listed_airline_oag_cd	OAG Carrier Code	Airline Code	✓	✓		
	flt_oag_num_range_start	Start of range of flight numbers that share codes	Flight Number	✓			
	oper_airline_oag_cd	OAG Carrier Code	Airline Code		✓		✓
	flt_oag_num_range_end	End of range of flight numbers that share codes	Flight Number				
DAYS	day_oag_cd	OAG Code for day of the week (1=Monday … 7=Sunday)	Day ID	✓			
	day_nm	Name of the day of the week	Day Name				
DOT AIRCRAFT MODEL	dot_model_cd	DOT Equipment Model Code	Equipment Code	✓			
	sys_manufact_num	System Generated Equipment Manufacturer ID	Numeric Id		✓		
	dot_model_nm	DOT Equipment Model Name	Name			✓	
	dot_model_series_nm	DOT Equipment Series Name	Name				✓
	dot_model_mtow	DOT Equipment Maximum take-off weight	Weight				✓
	dot_model_num_eng_type	DOT Aircraft Model Engine Type (number of engines in free-text form)	Num Engine Type				✓
	dot_model_short_nm	DOT Equipment Model Short Name	Short Name			✓	✓
	sys_model_type_num	System Generated Aircraft Model Type Number	Numeric Id		✓		✓
DOT AIRLINE	airline_dot_cd	DOT Carrier Code	Airline Code	✓			
	airline_group_num	Carrier Group Number (Group 1, 2, or 3)	Airline Group				
	airline_type	Airline Type - Scheduled or Other	Airline Type				
DOT FLIGHT SEGMENT DATA	airline_dot_cd	DOT Carrier Code	Airline Code	✓	✓	✓	
	depart_port_dot_cd	DOT Place Code (Airport or City)	DOT Place Code	✓	✓	✓	
	arrive_port_dot_cd	DOT Place Code (Airport or City)	DOT Place Code	✓	✓	✓	
	dot_model_cd	DOT Equipment Model Code	Equipment Code	✓	✓	✓	
	seg_data_yr	Flight Segment Data Year	Year	✓		✓	
	seg_data_month	System Generated Month ID (1=January … 12=December)	Month ID	✓	✓		
	seg_data_revenue_cap	Revenue (passenger and cargo) capacity (in pounds)	Item Count				✓
	seg_data_avail_seats	Available Seats	Item Count				✓
	seg_data_block_min	Block Time (in minutes)	Item Count				✓
	seg_data_num_trips	Trips Flown	Item Count			✓	✓
	seg_data_onboard_pass	Onboard Passengers	Item Count			✓	✓
	seg_data_stage_len	Stage Length of Flight	Item Count				✓
DOT PLACE	dot_place_cd	DOT Place Code (Airport or City)	DOT Place Code	✓			
	dot_place_lat_degr	Airport Latitude - Degrees part	Degree				✓

Table A-2. QRS Database Attribute Definitions (Con't.)

Entity Header	Attribute Name	Attribute Definition	Domain	Primary Key	Foreign Key	Other Index	NULL Allowed
	dot_place_lat_min	Airport Latitude - Minutes part	Minute				✓
	dot_place_lat_sec	Airport Latitude - Seconds part	Second				✓
	dot_place_lat_hemi	Airport Latitude - Hemisphere part	Hemisphere				✓
	dot_place_long_degr	Airport Longitude - Degrees part	Degree				✓
	dot_place_long_min	Airport Longitude - Minutes part	Minute				✓
	dot_place_long_sec	Airport Longitude - Seconds part	Second				✓
	dot_place_long_hemi	Airport Longitude - Hemisphere part	Hemisphere				✓
	dot_place_nm	DOT Place Name (Airport or City)	Name			✓	
	world_area_cd	World Area Code	World Area Code		✓		✓
EMPLOYEE COUNT	airline_dot_cd	DOT Carrier Code	Airline Code	✓	✓		
	entity_dot_cd	Carrier Entity DOT identifier code	Entity	✓	✓		
	empct_data_yr	Employee Count data year	Year	✓			
	empct_ac_ctrl	A/C Control (26.2) (Groups 2 & 3 only)	Item Count				✓
	empct_ac_traffic	A/C Traffic (26.1) (Groups 2 & 3 only)	Item Count				✓
	empct_craft_hndl	Aircraft and handling (26) (Group 1 only)	Item Count				✓
	empct_flt_attendants	Flight Attendants (24.2)	Item Count				✓
	empct_flt_oper_other	Other flying operations (24.1)	Item Count				✓
	empct_flt_pers_pilots	Pilots and co-pilots	Item Count				✓
	empct_gen_mgmt	General management	Item Count				✓
	empct_hndl_cargo	Cargo handling (26.4) (Groups 2 & 3 only)	Item Count				✓
	empct_hndl_pass	Passenger handling (26.3) (Groups 2 & 3 only)	Item Count				✓
	empct_labor_maint	Maintenance labor	Item Count				✓
	empct_pers_other	Other personnel	Item Count				✓
	empct_pers_stat	Record keepers and statisticians	Item Count				✓
	empct_pers_traffic	Traffic solicitors	Item Count				✓
	empct_pers_train	Trainees and instructors	Item Count				✓
	empct_pers_transport	Transport-related	Item Count				✓
ENGINE	sys_engine_num	System Generated Engine ID Number	Numeric Id	✓			
	sys_manufact_num	System Generated Equipment Manufacturer ID	Numeric Id		✓		
	engine_model_nm	Engine Model Name	Name				
GROUP 1 OPERATING COSTS	airline_dot_cd	DOT Carrier Code	Airline Code	✓	✓		
	entity_dot_cd	Carrier Entity DOT identifier code	Entity	✓	✓		
	dot_model_cd	DOT Equipment Model Code	Equipment Code	✓	✓		
	grp1_data_yr	Group 1 Operating Costs Data Year	Year	✓			
	grp1_craft_fuel_oil	Aircraft fuel and oil	Money				✓
	grp1_equip_depr_rent	Flight equipment depreciation and rentals	Money				✓
	grp1_equip_maint	Flight equipment maintenance	Money				✓
	grp1_other_oper_not_rent	Other flight operations except rentals	Money				✓
	grp1_wages_benefits	Pilots and co-pilots salary/wages plus benefits	Money				✓

Table A-2. QRS Database Attribute Definitions (Con't.)

Entity Header	Attribute Name	Attribute Definition	Domain	Primary Key	Foreign Key	Other Index	NULL Allowed
GROUP 2 & 3 OPERATING COSTS	airline_dot_cd	DOT Carrier Code	Airline Code	✓	✓		
	entity_dot_cd	Carrier Entity DOT identifier code	Entity	✓	✓		
	dot_model_cd	DOT Equipment Model Code	Equipment Code	✓	✓		
	grp2_data_yr	Group 2 & 3 Operating Costs Data Year	Year	✓			
	grp2_amort_equip	Amortization-flight equipment capital leases	Money				✓
	grp2_appl_maint_burd	Applied maintenance burden-flight equipment	Money				✓
	grp2_craft_chrgs	Aircraft interchange outside charges	Money				✓
	grp2_craft_fuel	Aircraft fuel	Money				✓
	grp2_craft_maint_inter	Aircraft maintenance-interchange charges	Money				✓
	grp2_craft_oil	Aircraft oil	Money				✓
	grp2_craft_rent	Aircraft rentals	Money				✓
	grp2_depr_eng	Depreciation-engines	Money				✓
	grp2_depr_eng_parts	Depreciation-engine parts	Money				✓
	grp2_depr_frame	Depreciation-airframes	Money				✓
	grp2_depr_frame_parts	Depreciation-airframe parts	Money				✓
	grp2_depr_other	Depreciation-other flight equipment	Money				✓
	grp2_empl_benefits	Employee benefits and pensions	Money				✓
	grp2_eng_maint_labor	Engine maintenance-labor	Money				✓
	grp2_eng_maint_materials	Engine maintenance-materials	Money				✓
	grp2_eng_maint_outside	Engine maintenance-outside repair	Money				✓
	grp2_eng_overhaul_def	Engine overhaul deferred	Money				✓
	grp2_eng_worthy_prov	Engine airworthiness provisions	Money				✓
	grp2_flt_pers_wages	Other flight personnel wages	Money				✓
	grp2_frame_maint_labor	Airframe maintenance-labor	Money				✓
	grp2_frame_maint_materials	Airframe maintenance-materials	Money				✓
	grp2_frame_maint_outside	Airframe maintenance-outside repair	Money				✓
	grp2_frame_overhaul_def	Airframe overhaul deferred	Money				✓
	grp2_frame_worthy_prov	Airframe airworthiness provisions	Money				✓
	grp2_instr_wages	Trainees and instructors	Money				✓
	grp2_insurance_purch	Dollar amount of insurance purchased	Money				
	grp2_loss_damage	Injuries, loss, and damage	Money				✓
	grp2_other_fly_exp	Other flying expenses	Money				✓
	grp2_other_supp	Other supplies	Money				✓
	grp2_other_taxes	Taxes other than payroll	Money				✓
	grp2_payroll_taxes	Payroll taxes	Money				✓
	grp2_pers_exp	Personnel expenses	Money				✓
	grp2_pilot_wages	Pilots and co-pilots wages	Money				✓

Table A-2. QRS Database Attribute Definitions (Con't.)

Entity Header	Attribute Name	Attribute Definition	Domain	Primary Key	Foreign Key	Other Index	NULL Allowed
	grp2_prof_exp	Professional and technical fees and expenses	Money				✓
	grp2_expd_parts_obs_det	Obsolescence and deterioration, expendable parts	Money				✓
MANUFACTURER	sys_manufact_num	System Generated Equipment Manufacturer ID	Numeric Id	✓			
	manufact_nm	Manufacturer Name	Name				
MONTHS	sys_month_num	System Generated Month ID (1=January … 12=December)	Month ID	✓			
	month_nm	Month Name	Month Name				
	month_qtr	Quarter in which Month falls 1=Jan,Feb,Mar 2=Apr,May,Jun 3=Jul,Aug,Sep 4=Oct,Nov,Dec	Quarter				
	month_day_cnt	Count of days in the month (February is always 28).	Item Count				✓
OAG AIRCRAFT MODEL	oag_model_cd	OAG Equipment Model Code	Equipment Code	✓			
	sys_manufact_num	System Generated Equipment Manufacturer ID	Numeric Id		✓		
	oag_model_nm	OAG Equipment Model Name	Name			✓	
	oag_model_series_nm	OAG Equipment Series Name	Name				✓
	oag_model_gtow	OAG Aircraft Model Gross Takeoff Weight	Weight				✓
	oag_model_num_eng_type	OAG Aircraft Model Engine Type (number of engines in free-text form)	Num Engine Type				✓
	oag_model_seat_low_cnt	OAG Aircraft Model low-end seat count	Item Count				✓
	oag_model_seat_high_cnt	OAG Aircraft Model high-end seat count	Item Count				✓
	sys_model_type_num	System Generated Aircraft Model Type Number	Numeric Id		✓		✓
	oag_model_usage_yrs	An eight-bit bitmap that defines the years that a piece of equipment is being used. The bits from the rightmost (least significant) bit represent years: 1993,1998,2003,2005,2010,2015,2020,2025	Bitmap				✓
OAG AIRLINE	airline_oag_cd	OAG Carrier Code	Airline Code	✓			
	airline_code_share	TRUE if a code sharing airline	Boolean				
OAG AIRPORT DATA	port_data_yr	Calendar Year	Year	✓	✓		
	sys_month_num	System Generated Month ID (1=January … 12=December)	Month ID	✓	✓	✓	
	day_oag_cd	OAG Code for day of the week (1=Monday … 7=Sunday)	Day ID	✓	✓	✓	
	port_data_hour_num	Hour of airport data	Hour Number	✓		✓	
	port_data_min_num	Minute of airport data	Minute Number	✓		✓	
	oag_place_cd	OAG Place Code (Airport or City)	OAG Place Code	✓	✓	✓	
	oag_model_cd	OAG Equipment Model Code	Equipment Code	✓	✓	✓	
	airline_oag_cd	OAG Carrier Code	Airline Code	✓	✓	✓	
	port_data_depart_cnt	Count of departures at airport	Item Count				✓
	port_data_arrival_cnt	Count of arrivals at airport	Item Count				✓
OAG FARE CLASS	fare_class_oag_cd	OAG Fare Class Code	Fare Class	✓			
	fare_class_nm	Fare Class Name	Name				

Table A-2. QRS Database Attribute Definitions (Con't.)

Entity Header	Attribute Name	Attribute Definition	Domain	Primary Key	Foreign Key	Other Index	NULL Allowed
OAG FLIGHT	sys_flt_num	System Generated OAG Flight ID	Numeric Id	✓			
	depart_port_oag_cd	OAG Place Code (Airport or City)	OAG Place Code		✓		
	arrive_port_oag_cd	OAG Place Code (Airport or City)	OAG Place Code		✓		
	airline_oag_cd	OAG Carrier Code	Airline Code		✓		
	oag_model_cd	OAG Equipment Model Code	Equipment Code		✓		
	flt_oag_num	OAG Flight Number	Flight Number			✓	
	flt_eff_range_start_dt	OAG Flight Effective Range Start Date	Date			✓	✓
	flt_eff_range_end_dt	OAG Flight Effective Range End Date	Date				✓
	flt_sched_depart_tm	OAG Scheduled Flight Departure Time	Time				
	flt_sched_arrive_tm	OAG Scheduled Flight Arrival Time	Time				
	flt_sched_elapse_min	OAG Scheduled Flight Elapsed Time (in minutes)	Elapsed Time				
	flt_type	Flight Type (Passenger or Cargo)	Flight Type				
OAG FLIGHT DEPARTURE	sys_flt_num	System Generated OAG Flight ID	Numeric Id	✓	✓		
	depart_day_oag_cd	OAG Code for day of the week (1=Monday … 7=Sunday)	Day ID	✓	✓		
OAG FLIGHT EXCEPTIONS	sys_flt_num	System Generated OAG Flight ID	Numeric Id	✓	✓		
	exception_dt	Date of schedule exception	Date	✓			
	exception_type	Type of exception (EX or OP)	Exception Type				
OAG FLIGHT FARE CLASS	sys_flt_num	System Generated OAG Flight ID	Numeric Id	✓	✓		
	fare_class_oag_cd	OAG Fare Class Code	Fare Class	✓	✓		
OAG FLIGHT SEGMENT DATA	oag_seg_data_yr	Calendar Year	Year	✓	✓		
	oag_model_cd	OAG Equipment Model Code	Equipment Code	✓	✓	✓	
	airline_oag_cd	OAG Carrier Code	Airline Code	✓	✓	✓	
	oag_seg_depart_port_cd	OAG Place Code (Airport or City)	OAG Place Code	✓	✓	✓	
	oag_seg_arrive_port_cd	OAG Place Code (Airport or City)	OAG Place Code	✓	✓	✓	
	oag_seg_depart_cnt	Count of departures on this segment (calculated from OAG Flight Data)	Item Count				✓
	oag_seg_load_factor	Load factor for this flight segment	Float				✓
	oag_seg_stage_len	Stage length in miles for this flight segment	Distance				✓
	oag_seg_total_block_min	Total block time for segment	Item Count				✓
OAG NON-SHARED FLIGHT SEGMENT DATA	oag_ns_data_year	Calendar Year	Year	✓	✓		
	oag_model_cd	OAG Equipment Model Code	Equipment Code	✓	✓	✓	
	oag_ns_seg_depart_port_cd	OAG Place Code (Airport or City)	OAG Place Code	✓	✓	✓	
	oag_ns_seg_arrive_port_cd	OAG Place Code (Airport or City)	OAG Place Code	✓	✓	✓	
	oag_ns_seg_depart_cnt	Count of departures on this segment (calculated from OAG Flight Data)	Item Count				✓
	oag_ns_seg_load_factor	Load factor for this flight segment	Float				✓

Table A-2. QRS Database Attribute Definitions (Con't.)

Entity Header	Attribute Name	Attribute Definition	Domain	Primary Key	Foreign Key	Other Index	NULL Allowed
	oag_ns_seg_stage_len	Stage length in miles for this flight segment	Distance				✓
	oag_ns_seg_total_block_min	Total block time for segment	Item Count				✓
OAG NOSHARE AIRPORT DATA	port_ns_data_yr	Year for airport data	Year	✓			
	sys_month_num	System Generated Month ID (1=January … 12=December)	Month ID	✓		✓	
	day_oag_cd	OAG Code for day of the week (1=Monday … 7=Sunday)	Day ID	✓		✓	
	port_ns_data_hour_num	Hour for airport data	Hour Number	✓		✓	
	port_ns_data_min_num	Minute for airport data	Minute Number	✓		✓	
	oag_place_cd	OAG Place Code (Airport or City)	OAG Place Code	✓		✓	
	oag_model_cd	OAG Equipment Model Code	Equipment Code	✓		✓	
	port_ns_data_depart_cnt	Departure count for airport	Item Count				✓
	port_ns_data_arrival_cnt	Arrival count for airport	Item Count				✓
OAG PLACE	oag_place_cd	OAG Place Code (Airport or City)	OAG Place Code	✓			
	oag_place_lat_degr	Airport Latitude - Degrees part	Degree				✓
	oag_place_lat_min	Airport Latitude - Minutes part	Minute				✓
	oag_place_lat_sec	Airport Latitude - Seconds part	Second				✓
	oag_place_lat_hemi	Airport Latitude - Hemisphere part	Hemisphere				✓
	oag_place_long_degr	Airport Longitude - Degrees part	Degree				✓
	oag_place_long_min	Airport Longitude - Minutes part	Minute				✓
	oag_place_long_sec	Airport Longitude - Seconds part	Second				✓
	oag_place_long_hemi	Airport Longitude - Hemisphere part	Hemisphere				✓
	oag_place_nm	OAG Place Name (Airport or City)	Name			✓	
OD AIRPORT TOTAL	oad_total_port_cd	DOT Place Code (Airport or City)	DOT Place Code	✓	✓		
	oad_total_data_yr	Data Year	Year	✓			
	oad_dom_pass_cnt_arrive_sum	Purely domestic O&D passengers who started their journey at the origin and finished their journey at the destination ($1/10^{th}$ sample)	Long Item Count				✓
	oad_dom_pass_rev_arrive_sum	Purely Domestic O&D Passenger Revenues ($1/10^{th}$ sample)	Money				✓
	oad_init_trip_cnt_arrive_sum	Number Of Initiated Trips ($1/10^{th}$ sample)	Long Item Count				✓
	oad_intl_pass_cnt_arrive_sum	Passenger count for the portion of an international journey which included a U.S. origin and last U.S. port for outbound trips or first U.S. port and a U.S. destination for inbound trips ($1/10^{th}$ sample)	Long Item Count				✓
	oad_dom_pass_cnt_depart_sum	Purely domestic O&D passengers who started their journey at the origin and finished their journey at the destination ($1/10^{th}$ sample)	Long Item Count				✓
	oad_dom_pass_rev_depart_sum	Purely Domestic O&D Passenger Revenues ($1/10^{th}$ sample)	Money				✓

Table A-2. QRS Database Attribute Definitions (Con't.)

Entity Header	Attribute Name	Attribute Definition	Domain	Primary Key	Foreign Key	Other Index	NULL Allowed
	oad_init_trip_cnt_depart_sum	Number Of Initiated Trips (1/10th sample)	Long Item Count				✓
	oad_intl_pass_cnt_depart_sum	Passenger count for the portion of an international journey which included a U.S. origin and last U.S. port for outbound trips or first U.S. port and a U.S. destination for inbound trips (1/10th sample)	Long Item Count				✓
OD FLIGHT SEGMENT TOTAL	oad_seg_orig_port_cd	DOT Place Code (Airport or City)	DOT Place Code	✓	✓		
	oad_seg_dest_port_cd	DOT Place Code (Airport or City)	DOT Place Code	✓	✓		
	oad_seg_data_yr	Data Year	Year	✓			
	oad_seg_avg_coupons_sum	Average Coupons Used (a measure of number of flight segments traveled between origin and destination, i.e. If average coupons used equals one, then all flights were direct but not necessarily non-stop)	Float				✓
	oad_seg_avg_itin_miles_sum	Average Itinerary Miles Flown	Float				✓
	oad_seg_dom_pass_cnt_sum	Purely domestic O&D passengers who started their journey at the origin and finished their journey at the destination (1/10th sample)	Long Item Count				✓
	oad_seg_dom_pass_rev_sum	Purely Domestic O&D Passenger Revenues (1/10th sample)	Money				✓
	oad_seg_dom_zero_fare_cnt_sum	Purely domestic O&D passengers who paid zero fare (1/10th sample)	Long Item Count				✓
	oad_seg_intl_pass_cnt_sum	Passenger count for the portion of an international journey which included a U.S. origin and last U.S. port for outbound trips or first U.S. port and a U.S. destination for inbound trips (1/10th sample)	Long Item Count				✓
OPERATOR	sys_oper_num	System Generated Operator ID	Numeric Id	✓			
	world_area_cd	World Area Code	World Area Code		✓		✓
	sys_oper_type_num	System Generated Operator Type ID Number	Numeric Id		✓		
	oper_nm	Operator Name	Name				
OPERATOR TYPE	sys_oper_type_num	System Generated Operator Type ID Number	Numeric Id	✓			
	oper_type_nm	Operator type name (airline, government, leasing company, etc.)	Name				
ORIGIN AND DESTINATION	oad_orig_port_cd	DOT Place Code (Airport or City)	DOT Place Code	✓	✓	✓	
	oad_dest_port_cd	DOT Place Code (Airport or City)	DOT Place Code	✓	✓	✓	
	oad_data_year	Origin and Destination Data Year	Year	✓			
	oad_data_qtr	Data Quarter	Quarter	✓			
	oad_avg_coupons	Average Coupons Used (a measure of number of flight segments traveled between origin and destination, i.e. If average coupons used equals one, then all flights were direct but not necessarily non-stop)	Float				✓
	oad_avg_itin_miles	Average Itinerary Miles Flown	Float				✓
	oad_dom_pass_cnt	Purely domestic O&D passengers who started their journey at the origin and finished their journey at the destination (1/10th sample)	Long Item Count				✓
	oad_dom_pass_rev	Purely Domestic O&D Passenger Revenues (1/10th sample)	Money				✓

Table A-2. QRS Database Attribute Definitions (Con't.)

Entity Header	Attribute Name	Attribute Definition	Domain	Primary Key	Foreign Key	Other Index	NULL Allowed
	oad_dom_zero_fare_cnt	Purely domestic O&D passengers who paid zero fare (1/10th sample)	Long Item Count				✓
	oad_init_trip_cnt	Number Of Initiated Trips (1/10th sample)	Long Item Count				✓
	oad_intl_pass_cnt	Passenger count for the portion of an international journey which included a U.S. origin and last U.S. port for outbound trips or first U.S. port and a U.S. destination for inbound trips (1/10th sample)	Long Item Count				✓
PROFIT AND LOSS	airline_dot_cd	DOT Carrier Code	Airline Code	✓	✓		
	entity_dot_cd	Carrier Entity DOT identifier code	Entity	✓	✓		
	pl_data_yr	Profit and Loss Data Year	Year	✓			
	pl_exp_depr_amort	Depreciation and amortization	Money				✓
	pl_exp_ga	General and administrative expense	Money				✓
	pl_exp_maint	Maintenance expense	Money				✓
	pl_exp_oper	Flying operations expense	Money				✓
	pl_exp_pass_serv	Passenger service expense	Money				✓
	pl_exp_promot_sales	Promotion and sales expense	Money				✓
	pl_exp_traffic_serv	A/C and traffic service expense	Money				✓
	pl_exp_transport	Transport-related expense	Money				✓
	pl_rev_charter	Charter revenues	Money				✓
	pl_rev_freight	Mail and freight revenues	Money				✓
	pl_rev_other	Other revenues	Money				✓
	pl_rev_pass	Passenger revenues	Money				✓
	pl_exp_income_tax	Income tax expense	Money				✓
	pl_exp_interest_ltd	Interest on LTD and capital leases	Money				✓
	pl_exp_interest_other	Other interest expense	Money				✓
	pl_exp_nonoper	Other non-operating expense	Money				✓
	pl_extra_items	Discontinued operations, extraordinary items, accounting changes	Money				✓
RETIRED WORLD AREA	new_world_area_cd	World Area Code	World Area Code	✓	✓		
	old_world_area_cd	World Area Code	World Area Code	✓	✓		
TAF DATA	taf_place_cd	TAF Airport Code	TAF Place Code	✓	✓		
	taf_avg_vfr_days	Average VFR days/year	Float				✓
	taf_base_yr	Base year for TAF Operations data	Year				
	taf_forecast_start_yr	Year that TAF operations data begins being forecasted, as opposed to being actual.	Year				
	taf_ils_runway_cnt	Number of instrument landing system (ILS) equipped runways	Item Count				✓
	taf_pract_ann_cap	Practical annual capacity	Float				✓
	taf_runway_cnt	Number of runways	Item Count				✓
TAF OPERATIONS	taf_place_cd	TAF Airport Code	TAF Place Code	✓	✓		
	taf_oper_yr	Operation year for data	Year	✓		✓	
	taf_oper_carr_itin	Air carrier itinerant operations	Item Count				✓
	taf_oper_carr_enplane	Air carrier enplanements	Item Count				✓
	taf_oper_comm_enplane	Commuter enplanements	Item Count				✓
	taf_oper_gen_avi_itin	General aviation itinerant operations	Item Count				✓
	taf_oper_gen_avi_local	General aviation local operations	Item Count				✓

Table A-2. QRS Database Attribute Definitions (Con't.)

Entity Header	Attribute Name	Attribute Definition	Domain	Primary Key	Foreign Key	Other Index	NULL Allowed
	taf_oper_intl_enplane	International enplanements	Item Count				✓
	taf_oper_mil_itin	Military itinerant operations	Item Count				✓
	taf_oper_mil_local	Military local operations	Item Count				✓
	taf_oper_taxi_enplane	Air taxi enplanements	Item Count				✓
	taf_oper_taxi_itin	Air taxi itinerant operations	Item Count				✓
TAF PLACE	taf_place_cd	TAF Airport Code	TAF Place Code	✓			
	taf_place_nm	TAF Airport Name	Name				✓
	taf_city_nm	TAF City Name (the city that the airport is in)	Name				✓
	us_state_cd	US State Code	State Code		✓		✓
	taf_us_region_cd	TAF US Region Code	US Region Code		✓		✓
TAF US REGION	taf_us_region_cd	TAF US Region Code	US Region Code	✓			
	taf_us_region_nm	US Region Name	Name				
TAP WEATHER	dot_place_cd	DOT Place Code (Airport or City)	DOT Place Code	✓	✓		
	wx_date	Date of weather observation	Date	✓		✓	
	wx_hour	Hour of weather observation	Hour Number	✓		✓	
		1 = midnight to 12:59:59AM					
		24 = 11PM - 11:59:59PM					
	wx_barom_pressure	Barometric pressure	Pressure				✓
	wx_ceiling_height	Ceiling height in meters	Height				✓
	wx_horiz_visibility	Horizontal visibility in kilometers	Visibility				✓
	wx_hourly_precip	Hourly precipitation in inches	Depth				✓
	wx_meteor_cond	Meteorological conditions	Meteor Condition			✓	✓
		(VFR1, VFR2, IFR1, IFR2)					
	wx_obs_indicator	Weather observation indicator	Weather Index				
		0 - Weather observation made					
		9 - Weather observation not made or missing					
	wx_snow_depth	Snow depth in centimeters	Depth				✓
	wx_temperature	Temperature in degrees Celsius	Temperature				✓
	wx_weather_idx	9-character string that indicates weather conditions according to position in the string.	Weather Index			✓	
		The positions in the string indicate the following:					
		SAMSON Weather Index Codes					
		Pos. 1 - Storms					
		0 - Thunderstorm - lightning & thunder, gusts < 25.7 m/sec (55 mph), hail < 1.9 cm (¾ in)					
		1 - Heavy/severe thunderstorm, intense lightning & thunder, gusts > 25.7 m/sec, hail > 1.9 cm					
		2 - Report of tornado or waterspout					
		4 - Moderate squall					
		6 - Waterspout (beginning 1984)					
		7 - Funnel cloud (beginning 1984)					
		8 - Tornado (beginning 1984)					
		9 - None					
		Pos. 2 - Rain showers					
		0 - Light rain					
		1 - Moderate rain					
		2 - Heavy rain > .76 cm/hr					

Table A-2. QRS Database Attribute Definitions (Con't.)

Entity Header	Attribute Name	Attribute Definition	Domain	Primary Key	Foreign Key	Other Index	NULL Allowed
		3 - Light rain showers 4 - Moderate rain showers 5 - Heavy rain showers 6 - Light freezing rain 7 - Moderate freezing rain 8 - Heavy freezing rain 9 - None Pos. 3 - Rain squalls 0 - Light squalls 1 - Moderate squalls 3 - Light drizzle 4 - Moderate drizzle 5 - Heavy drizzle 6 - Light freezing drizzle 7 - Moderate freezing drizzle 8 - Heavy freezing drizzle 9 - None Pos. 4 - Snow 0 - Light snow 1 - Moderate snow 2 - Heavy snow 3 - Light snow pellets 4 - Moderate snow pellets 5 - Heavy snow pellets 6 - Light ice crystals 7 - Moderate ice crystals 8 - Heavy ice crystals 9 - None Pos. 5 - Snow showers or squalls (no 6,7,8) 0 - Light snow showers 1 - Moderate snow showers 2 - Heavy snow showers 3 - Light snow squall 4 - Moderate snow squall 5 - Heavy snow squall 9 - None Pos. 6 - Sleet or hail 0 - Light ice pellet showers 1 - Moderate ice pellet showers 3 - Light ice pellet showers 4 - Hail Pos. 7 - Fog, Blowing dust, Blowing sand 0 - Fog 1 - Ice fog 2 - Ground fog 3 - Blowing dust 4 - Blowing sand 5 - Heavy fog 6 - Glaze (beginning 1984) 7 - Heavy ice fog 8 - Heavy ground fog 9 - None Pos. 8 - Smoke, haze, blowing snow				

Table A-2. QRS Database Attribute Definitions (Con't.)

Entity Header	Attribute Name	Attribute Definition	Domain	Primary Key	Foreign Key	Other Index	NULL Allowed
		0 - Smoke					
		1 - Haze					
		2 - Smoke & haze					
		3 - Dust					
		4 - Blowing snow					
		5 - Blowing spray					
		6 - Dust storm (beginning 1984)					
		7 - Volcanic ash					
		9 - None					
		Pos. 9 - Ice pellets					
		0 - Light					
		1 - Moderate					
		2 - Heavy					
		9 - None					
	wx_wind_direction	Wind direction in degrees	Direction				ü
	wx_wind_speed	Wind speed in m/sec	Velocity				ü
TRAFFIC	airline_dot_cd	DOT Carrier Code	Airline Code	ü	ü		
	entity_dot_cd	Carrier Entity DOT identifier code	Entity	✓	✓		
	dot_model_cd	DOT Equipment Model Code	Equipment Code	✓	✓		
	traf_data_yr	Traffic Data Year	Year	✓			
	traf_airborne_hours	Airborne hours	Item Count				✓
	traf_block_hours	Block hours	Item Count				✓
	traf_craft_days	Aircraft days, carrier routes	Item Count				✓
	traf_fuel_gal	Gallons of fuel	Item Count				✓
	traf_sched_asm	Scheduled available seat miles	Long Item Count				✓
	traf_sched_ns_ac_rev_dep	Scheduled and non-scheduled A/C revenue departures	Item Count				✓
	traf_sched_ns_ac_rev_mi	Scheduled and non-scheduled A/C revenue miles	Item Count				✓
	traf_sched_ns_asm	Scheduled and non-scheduled available seat miles	Long Item Count				✓
	traf_sched_ns_freight_rtm	Scheduled and non-scheduled freight revenue ton miles (in 1000s)	Long Item Count				✓
	traf_sched_ns_mail_rtm	Scheduled and non-scheduled mail revenue ton miles (in 1000s)	Long Item Count				✓
	traf_sched_ns_rpm	Scheduled and non-scheduled revenue passenger miles	Long Item Count				✓
	traf_sched_ns_total_atm	Scheduled and non-scheduled total available ton miles (in 1000s)	Long Item Count				✓
	traf_sched_pass_enplane	Scheduled passenger enplanements	Item Count				✓
	traf_sched_rpm	Scheduled revenue passenger miles	Long Item Count				✓
	traf_sched_total_atm	Scheduled total available ton miles (in 1000s)	Long Item Count				✓
	traf_sched_total_rtm	Scheduled total revenue ton miles (in 1000s)	Long Item Count				✓
US STATE	us_state_cd	US State Code	State Code	✓			
	us_state_nm	US State Name	Name				
WORLD AREA	world_area_cd	World Area Code	World Area Code	✓			
	world_area_nm	World Area Name	Name			✓	
	world_area_grp_cd	World Area Group Code	World Area Code		✓		
WORLD AREA GROUP	world_area_grp_cd	World Area Group Code	World Area Code	✓			

Table A-2. QRS Database Attribute Definitions (Con't.)

Entity Header	Attribute Name	Attribute Definition	Domain	Primary Key	Foreign Key	Other Index	NULL Allowed
	world_area_grp_nm	World Area Group Name	Name				
YEAR	year_num	Calendar Year	Year	✓			
	cal_id_num	Calendar ID Number	Calendar ID		✓		

QRS DATABASE PHYSICAL DEVICE ALLOCATIONS

Table A-3. QRS Database Physical Device Allocations

Volume Group	Logical Volume	Size (in MB)	Contents	Database
/dev/vg01	lvol1	500	/sybase	N/A
/dev/vg01	rlvol2	300	logdev	master
/dev/vg01	rlvol3	100	datadev1	ASACQRS
/dev/vg01	unused	100	unused	N/A
/dev/vg02	rlvol1	40	master	master
/dev/vg02	rlvol2	732	asqp_ddev	ASACQRS
/dev/vg02	rlvol3	52	oagdep_ddev	ASACQRS
/dev/vg02	rlvol4	16	places_dxdev	ASACQRS
/dev/vg02	rlvol5	32	od_xdev	ASACQRS
/dev/vg02	rlvol6	128	datadev2	ASACQRS
/dev/vg03	rlvol1	40	master (mirror)	master
/dev/vg03	rlvol2	428	asqp_xdev	ASACQRS
/dev/vg03	rlvol3	24	oag_dep_xdev	ASACQRS
/dev/vg03	rlvol4	20	odfstot_dxdev	ASACQRS
/dev/vg03	rlvol5	488	datadev3	ASACQRS
/dev/vg04	rlvol1	12	sybsecurity	sybsecurity
/dev/vg04	rlvol2	500	tempdb_dev	tempdb
/dev/vg04	rlvol3	48	oagfl_xdev	ASACQRS
/dev/vg04	rlvol4	52	dotfs_ddev	ASACQRS
/dev/vg04	rlvol5	388	datadev4	ASACQRS
/dev/vg05	rlvol1	32	sybsystemproc	sybsystemproc
/dev/vg05	rlvol2	36	oagflt_ddev	ASACQRS
/dev/vg05	rlvol3	36	nshport_ddev	ASACQRS
/dev/vg05	rlvol4	16	oagfs_ddev	ASACQRS
/dev/vg05	rlvol5	92	dotfs_xdev	ASACQRS
/dev/vg05	rlvol6	52	reportspec_dev	REPORTSPEC
/dev/vg05	rlvol7	200	wx_xdev	ASACQRS
/dev/vg05	rlvol8	100	datadev5	unused
/dev/vg05	rlvol9	100	datadev6	ASACQRS
/dev/vg05	rlvol10	100	datadev7	ASACQRS
/dev/vg05	rlvol11	100	datadev8	ASACQRS
/dev/vg05	rlvol12	132	datadev9	ASACQRS
/dev/vg06	rlvol1	24	oagfare_dxdev	ASACQRS
/dev/vg06	rlvol2	112	nshport_xdev	ASACQRS
/dev/vg06	rlvol3	12	oagfs_xdev	ASACQRS

Table A-3. QRS Database Physical Device Allocations (Con't.)

Volume Group	Logical Volume	Size (in MB)	Contents	Database
/dev/vg06	rlvol6	100	datadev10	unused
/dev/vg06	rlvol7	100	datadev11	ASACQRS
/dev/vg06	rlvol8	100	datadev12	ASACQRS
/dev/vg06	rlvol9	100	datadev13	unused
/dev/vg06	rlvol10	100	datadev14	unused
/dev/vg06	rlvol11	116	datadev15	unused

QRS DATABASE SEGMENT USAGE

Table A-4. QRS Database Segment Usage

Segment	Physical Device	Device Size (MB)	Segment Size (MB)	Table Name	Index Name
system	datadev1	100	100	sysalternates	sysalternates
				sysattributes	csysattributes
				sysattributes	ncsysattributes
				sysattributes	tsysattributes
				syscolumns	syscolumns
				sysconstraints	csysconstraints
				sysconstraints	ncsysconstraints
				sysdepends	sysdepends
				sysgams	sysgams
				sysindexes	sysindexes
				syskeys	syskeys
				sysobjects	sysobjects
				sysobjects	ncsysobjects
				syspartitions	csyspartitions
				sysprocedures	sysprocedures
				sysprotects	sysprotects
				sysroles	csysroles
				syssegments	syssegments
				systhresholds	csysthresholds
				systypes	systypes
				systypes	ncsystypes
				sysusers	sysusers
				sysusers	ncsysusers1
				sysusers	ncsysusers2
default	datadev1	100	716	AIRCRAFT_INVENTORY	XPKAIRCRAFT_INVENTORY
	datadev2	128		AIRCRAFT_MODEL_TYPE	XPKAIRCRAFT_MODEL_TYPE
	datadev3	488		AIRLINE_ENTITY	AIRLINE_ENTITY
				AIRLINE_ENTITY	XPKAIRLINE_ENTITY
				AIRLINE_OPERATOR	AIRLINE_OPERATOR
				AIRLINE_OPERATOR	XPKAIRLINE_OPERATOR
				AIRPORT_DISTANCE	XPKAIRPORT_DISTANCE
				AIRPORT_RANK	XPKAIRPORT_RANK
				ASQP_AIRPORT_TOTAL	ASQP_AIRPORT_TOTAL
				ASQP_AIRPORT_TOTAL	XPKASQP_FLIGHT_SCHEDULE
				ASQP_FLIGHT_SEGMENT_TOTAL	XPKASQP_FLIGHT_SEGMENT_TOTALS
				B43_INVENTORY	XPKB43_INVENTORY
				BALANCE_SHEET	XPKBALANCE_SHEET
				CALENDAR	XPKCALENDAR
				CALENDAR_ID	CALENDAR_ID
				CALENDAR_ID	XPKCALENDAR_ID
				CODE_SHARING_AIRLINE	CODE_SHARING_AIRLINE
				CODE_SHARING_AIRLINE	XPKCODE_SHARING_AIRLINE
				DAYS	DAYS
				DAYS	XPKDAYS
				DOT_AIRCRAFT_MODEL	XPKDOT_AIRCRAFT_MODEL
				DOT_AIRCRAFT_MODEL	XIE2DOT_AIRCRAFT_MODEL
				DOT_AIRCRAFT_MODEL	XIE3DOT_AIRCRAFT_MODEL

Table A-4. QRS Database Segment Usage (Con't.)

Segment	Physical Device	Device Size (MB)	Segment Size (MB)	Table Name	Index Name
				EMPLOYEE_COUNT	EMPLOYEE_COUNT
				EMPLOYEE_COUNT	XPKEMPLOYEE_COUNT
				ENGINE	ENGINE
				ENGINE	XPKENGINE
				GROUP_1_OPERATING_COSTS	GROUP_1_OPERATING_COSTS
				GROUP_1_OPERATING_COSTS	XPKGROUP_1_OPERATING_COSTS
				GROUP_23_OPERATING_COSTS	GROUP_23_OPERATING_COSTS
				GROUP_23_OPERATING_COSTS	XPKGROUP_23_OPERATING_COSTS
				MANUFACTURER	XPKMANUFACTURER
				MONTHS	XPKMONTHS
				OAG_AIRCRAFT_MODEL	XPKOAG_AIRCRAFT_MODEL
				OAG_AIRCRAFT_MODEL	XIE2OAG_AIRCRAFT_MODEL
				OAG_AIRLINE	XPKOAG_AIRLINE
				OAG_AIRPORT_DATA	XPKOAG_AIRPORT_DATA
				OAG_AIRPORT_DATA	XIE1OAG_AIRPORT_DATA
				OAG_AIRPORT_DATA	XIE2OAG_AIRPORT_DATA
				OAG_AIRPORT_DATA	XIE3OAG_AIRPORT_DATA
				OAG_AIRPORT_DATA	XIE4OAG_AIRPORT_DATA
				OAG_AIRPORT_DATA	XIE5OAG_AIRPORT_DATA
				OAG_AIRPORT_DATA	XIE6OAG_AIRPORT_DATA
				OAG_FARE_CLASS	OAG_FARE_CLASS
				OAG_FARE_CLASS	XPKFARE_CLASS
				OAG_FLIGHT_EXCEPTIONS	OAG_FLIGHT_EXCEPTIONS
				OAG_FLIGHT_EXCEPTIONS	XPKEXCEPTIONS
				OAG_NOSHARE_FLIGHT_SEG_DAT	XPKOAG_NO_SHARE_FL_SEG_DAT
				OAG_NOSHARE_FLIGHT_SEG_DAT	XIE1OAG_NO_SHARE_FL_SEG_DAT
				OAG_NOSHARE_FLIGHT_SEG_DAT	XIE2OAG_NO_SHARE_FL_SEG_DAT
				OD_AIRPORT_TOTAL	XPKOD_AIRPORT_TOTAL
				OPERATOR	XPKOPERATOR
				OPERATOR_TYPE	OPERATOR_TYPE
				OPERATOR_TYPE	XPKOPERATOR_TYPE
				PROFIT_AND_LOSS	PROFIT_AND_LOSS
				PROFIT_AND_LOSS	XPKPROFIT_AND_LOSS
				TAF_DATA	TAF_DATA
				TAF_DATA	XPKTAF_DATA
				TAF_OPERATIONS	TAF_OPERATIONS
				TAF_OPERATIONS	XPKTAF_OPERATIONS
				TAF_OPERATIONS	XIE1TAF_OPERATIONS
				TAF_US_REGION	TAF_US_REGION
				TAF_US_REGION	XPKUS_REGION
				TRAFFIC	TRAFFIC
				TRAFFIC	XPKTRAFFIC
				YEAR	YEAR
				YEAR	XPKYEAR
				syscomments	syscomments
				sysreferences	csysreferences
				sysreferences	ncsysreferences
				sysreferences	nc2sysreferences
				sysusermessages	csysusermessages
				sysusermessages	ncsysusermessages

Table A-4. QRS Database Segment Usage (Con't.)

Segment	Physical Device	Device Size (MB)	Segment Size (MB)	Table Name	Index Name
logsegment	logdev	75	75	syslogs	syslogs
asqp_dseg	asqp_ddev	732	1,752	ASQP_FLIGHT_SCHEDULE	XIE1ASQP_FLIGHT_SCHEDULE
	datadev4	388			
	datadev6	100			
	datadev7	100			
	datadev8	100			
	datadev9	132			
	datadev11	100			
	datadev12	100			
asqp_xseg	asqp_xdev	428	428	ASQP_FLIGHT_SCHEDULE	XIE2ASQP_FLIGHT_SCHEDULE
				ASQP_FLIGHT_SCHEDULE	XIE3ASQP_FLIGHT_SCHEDULE
				ASQP_FLIGHT_SCHEDULE	XIF130ASQP_FLIGHT_SCHEDULE
dotfs_dseg	dotfs_ddev	52	52	DOT_FLIGHT_SEGMENT_DATA	DOT_FLIGHT_SEGMENT_DATA
dotfs_xseg	datadev4	388	480	DOT_FLIGHT_SEGMENT_DATA	XPKFLIGHT_SEGMENT_DATA
	dotfs_xdev	92		DOT_FLIGHT_SEGMENT_DATA	XIE1DOT_FLIGHT_SEGMENT_DATA
				DOT_FLIGHT_SEGMENT_DATA	XIE2DOT_FLIGHT_SEGMENT_DATA
				DOT_FLIGHT_SEGMENT_DATA	XIE3DOT_FLIGHT_SEGMENT_DATA
				DOT_FLIGHT_SEGMENT_DATA	XIE4DOT_FLIGHT_SEGMENT_DATA
				DOT_FLIGHT_SEGMENT_DATA	XIE5DOT_FLIGHT_SEGMENT_DATA
nshport_dseg	nshport_ddev	36	36	OAG_NOSHARE_AIRPORT_DATA	XPKOAG_NOSHARE_AIRPORT_DATA
nshport_xseg	nshport_xdev	112	112	OAG_NOSHARE_AIRPORT_DATA	XIE1OAG_NOSHARE_AIRPORT_DATA
				OAG_NOSHARE_AIRPORT_DATA	XIE2OAG_NOSHARE_AIRPORT_DATA
				OAG_NOSHARE_AIRPORT_DATA	XIE3OAG_NOSHARE_AIRPORT_DATA
				OAG_NOSHARE_AIRPORT_DATA	XIE4OAG_NOSHARE_AIRPORT_DATA
				OAG_NOSHARE_AIRPORT_DATA	XIE5OAG_NOSHARE_AIRPORT_DATA
oagdep_dxseg	oagdep_ddev	52	76	OAG_FLIGHT_DEPARTURE	XPKFLIGHT_DEPARTURE
	oagdep_xdev	24			
oagfare_dxseg	datadev4	388	412	OAG_FLIGHT_FARE_CLASS	XPKFLIGHT_FARE_CLASS
	oagfare_dxdev	24			
oagfl_xseg	datadev4	388	436	OAG_FLIGHT	XPKOAG_FLIGHT
	oagfl_xdev	48		OAG_FLIGHT	XIF124OAG_FLIGHT
				OAG_FLIGHT	XIF125OAG_FLIGHT
				OAG_FLIGHT	XIF126OAG_FLIGHT
				OAG_FLIGHT	XIF77OAG_FLIGHT
				OAG_FLIGHT	XIE1OAG_FLIGHT
oagflt_dseg	datadev4	388	424	OAG_FLIGHT	XIE2OAG_FLIGHT
	oagflt_ddev	36			
oagfs_dseg	oagfs_ddev	16	16	OAG_FLIGHT_SEGMENT_DATA	XPKOAG_FLIGHT_SEGMENT_DATA

Table A-4. QRS Database Segment Usage (Con't.)

Segment	Physical Device	Device Size (MB)	Segment Size (MB)	Table Name	Index Name
oagfs_xseg	oagfs_xdev	12	12	OAG_FLIGHT_SEGMENT_DATA	XIE1OAG_FLIGHT_SEGMENT_DATA
				OAG_FLIGHT_SEGMENT_DATA	XIE2OAG_FLIGHT_SEGMENT_DATA
				OAG_FLIGHT_SEGMENT_DATA	XIE3OAG_FLIGHT_SEGMENT_DATA
od_dxseg	od_ddev	60	92	ORIGIN_AND_DESTINATION	XPKORIGIN_AND_DESTINATION
	od_xdev	32			
odfstot_dxseg	odfstot_dxdev	20	20	OD_FLIGHT_SEGMENT_TOTAL	XPKOD_FLIGHT_SEGMENT_TOTAL
places_dxseg	places_dxdev	16	16	AIRPORT	AIRPORT
				AIRPORT	XPKAIRPORT
				AIRPORT_CITY	AIRPORT_CITY
				AIRPORT_CITY	XPKAIRPORT_CITY
				CITY	CITY
				CITY	XPKCITY
				DOT_PLACE	XIE1DOT_PLACE
				DOT_PLACE	XPKDOT_PLACE
				OAG_PLACE	XIE1OAG_PLACE
				OAG_PLACE	XPKOAG_PLACE
				RETIRED_WORLD_AREA	RETIRED_WORLD_AREA
				RETIRED_WORLD_AREA	XPKRETIRED_WORLD_AREA
				TAF_PLACE	XIE1TAF_PLACE
				TAF_PLACE	XPKTAF_PLACE
				US_STATE	US_STATE
				US_STATE	XPKUS_STATE
				WORLD_AREA	WORLD_AREA
				WORLD_AREA	XIE1WORLD_AREA
				WORLD_AREA	XPKWORLD_AREA
				WORLD_AREA_GROUP	WORLD_AREA_GROUP
				WORLD_AREA_GROUP	XPKWORLD_AREA_GROUP
wx_dseg	wx_ddev	176	176	TAP_WEATHER	XPKTAP_WEATHER
wx_xseg	wx_xdev	200	200	TAP_WEATHER	XIE1TAP_WEATHER
				TAP_WEATHER	XIE2TAP_WEATHER
				TAP_WEATHER	XIE3TAP_WEATHER
				TAP_WEATHER	XIE4TAP_WEATHER

QRS DATABASE ENTITY-RELATIONSHIP DIAGRAM

Figure A-2. QRS Database Entity-Relationship Diagram

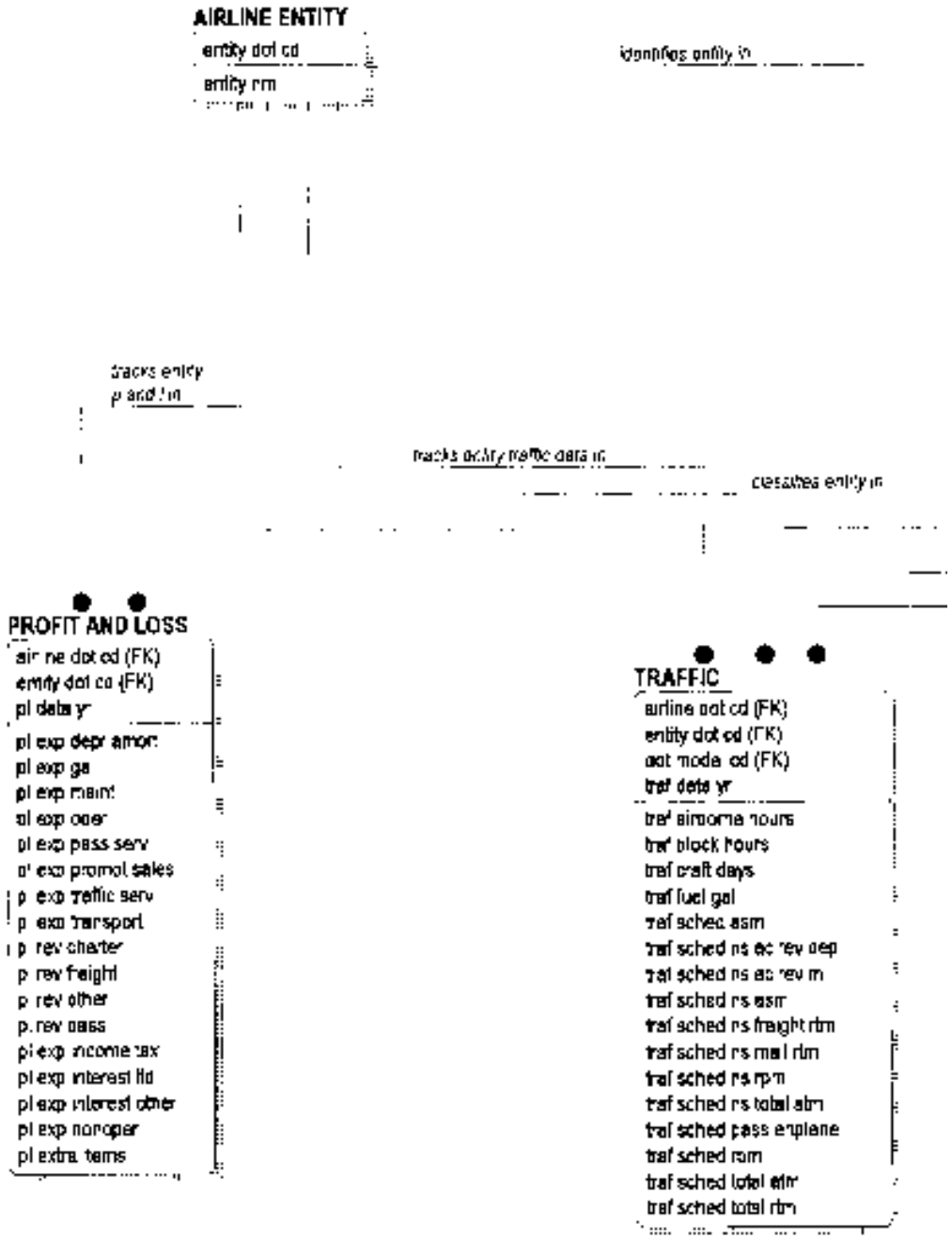


Figure A-2. QRS Database Entity-Relationship Diagram (Con't.)

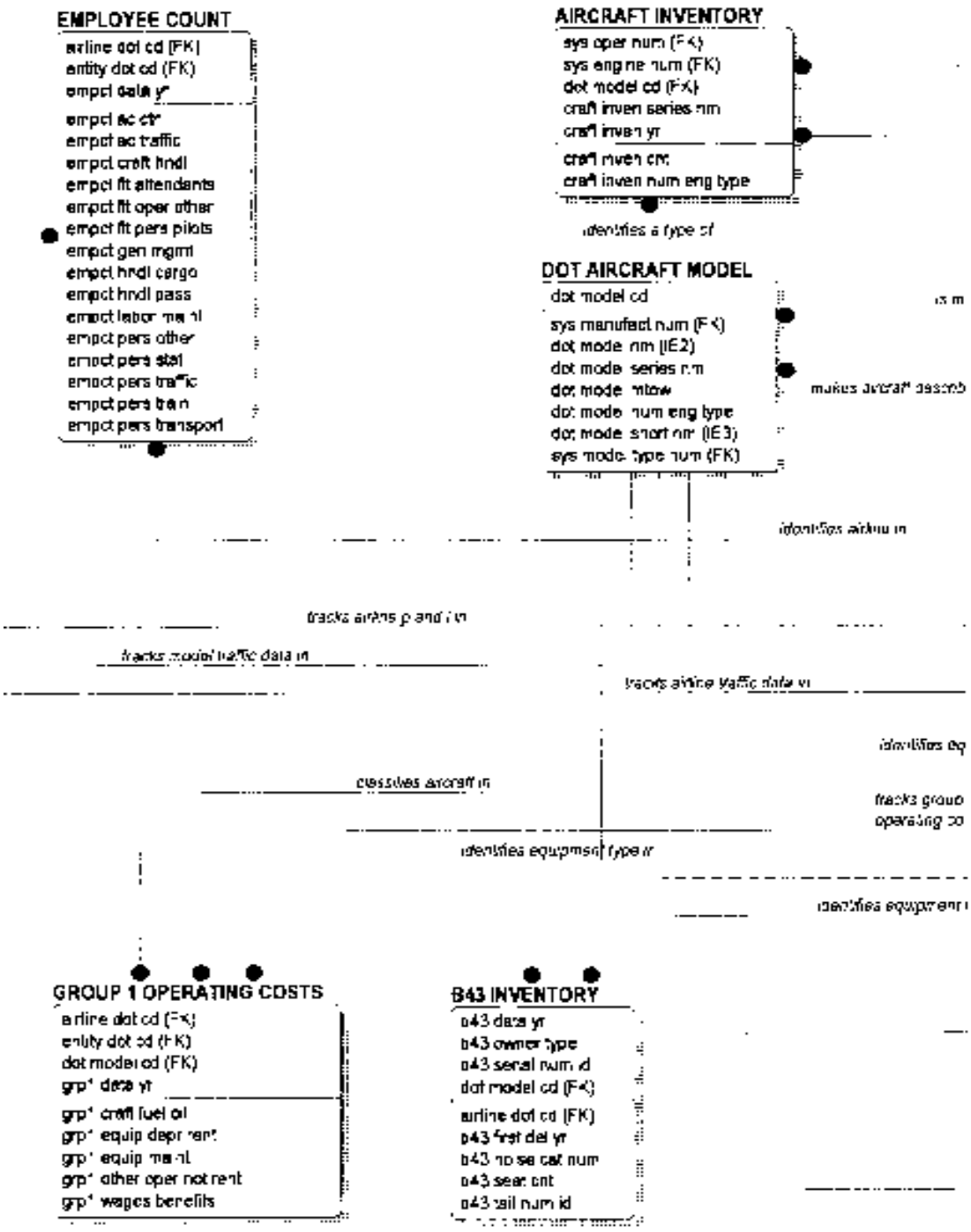


Figure A-2. QRS Database Entity-Relationship Diagram (Con't.)

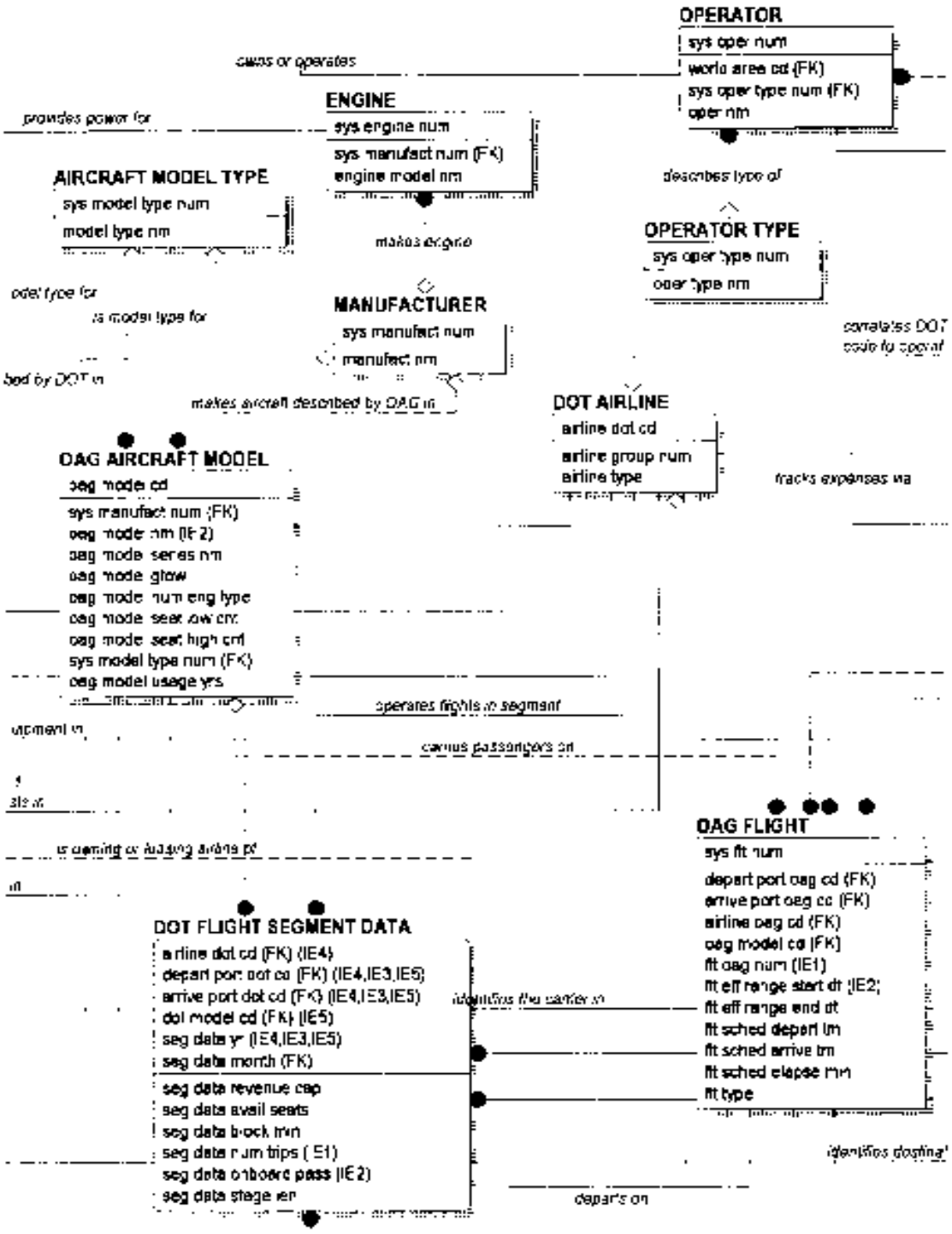


Figure A-2. QRS Database Entity-Relationship Diagram (Con't.)

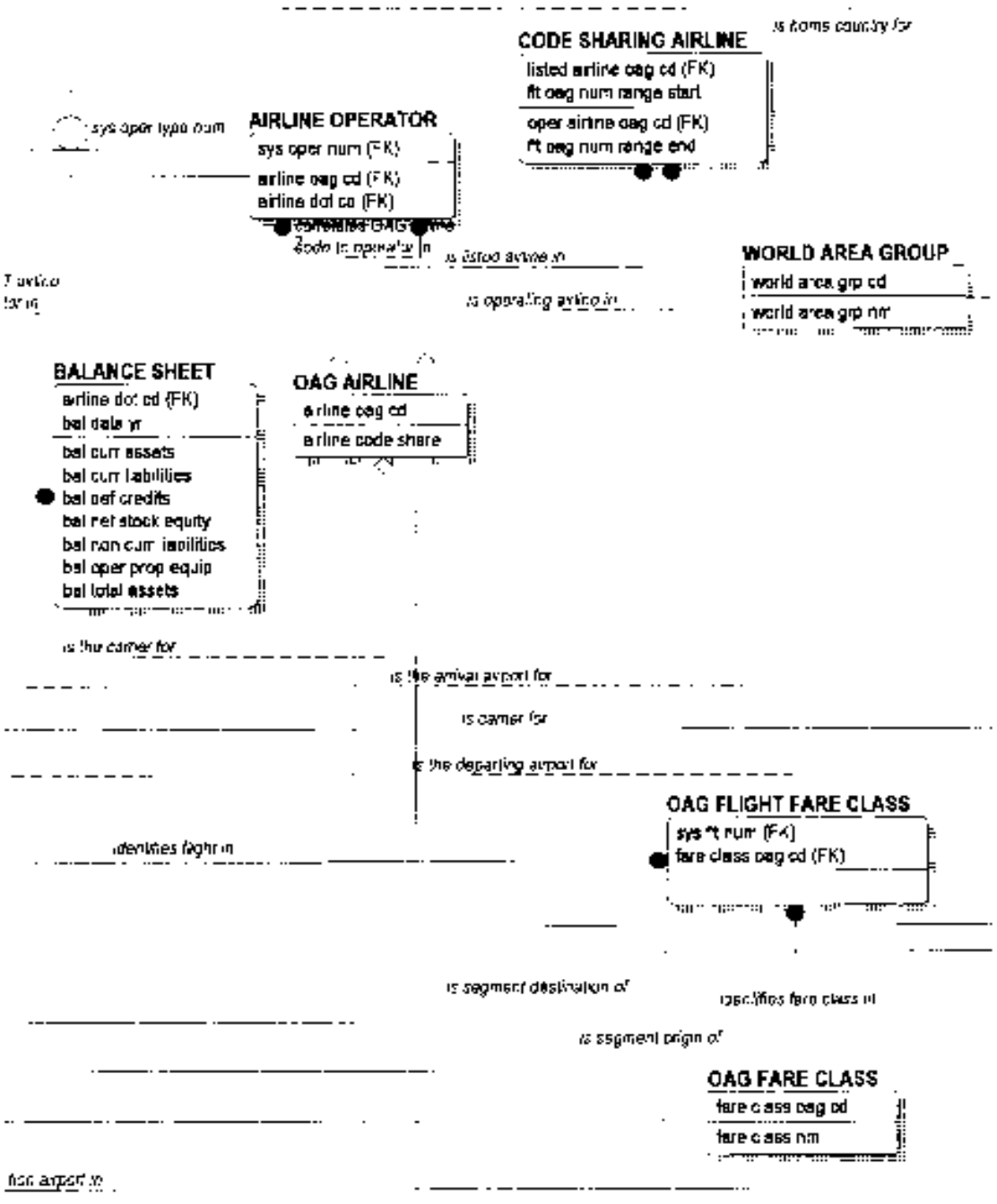


Figure A-2. QRS Database Entity-Relationship Diagram (Con't.)

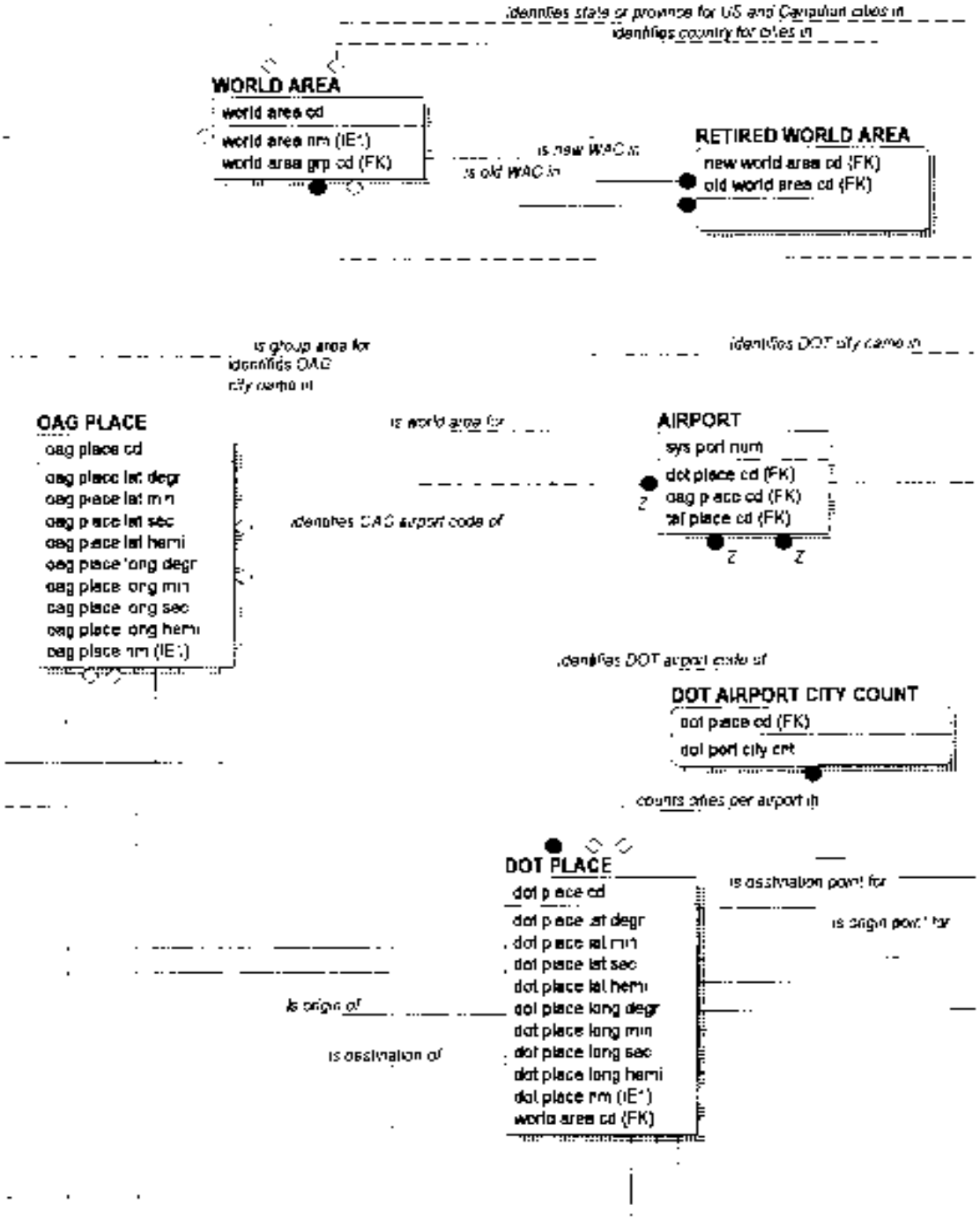


Figure A-2. QRS Database Entity-Relationship Diagram (Con't.)

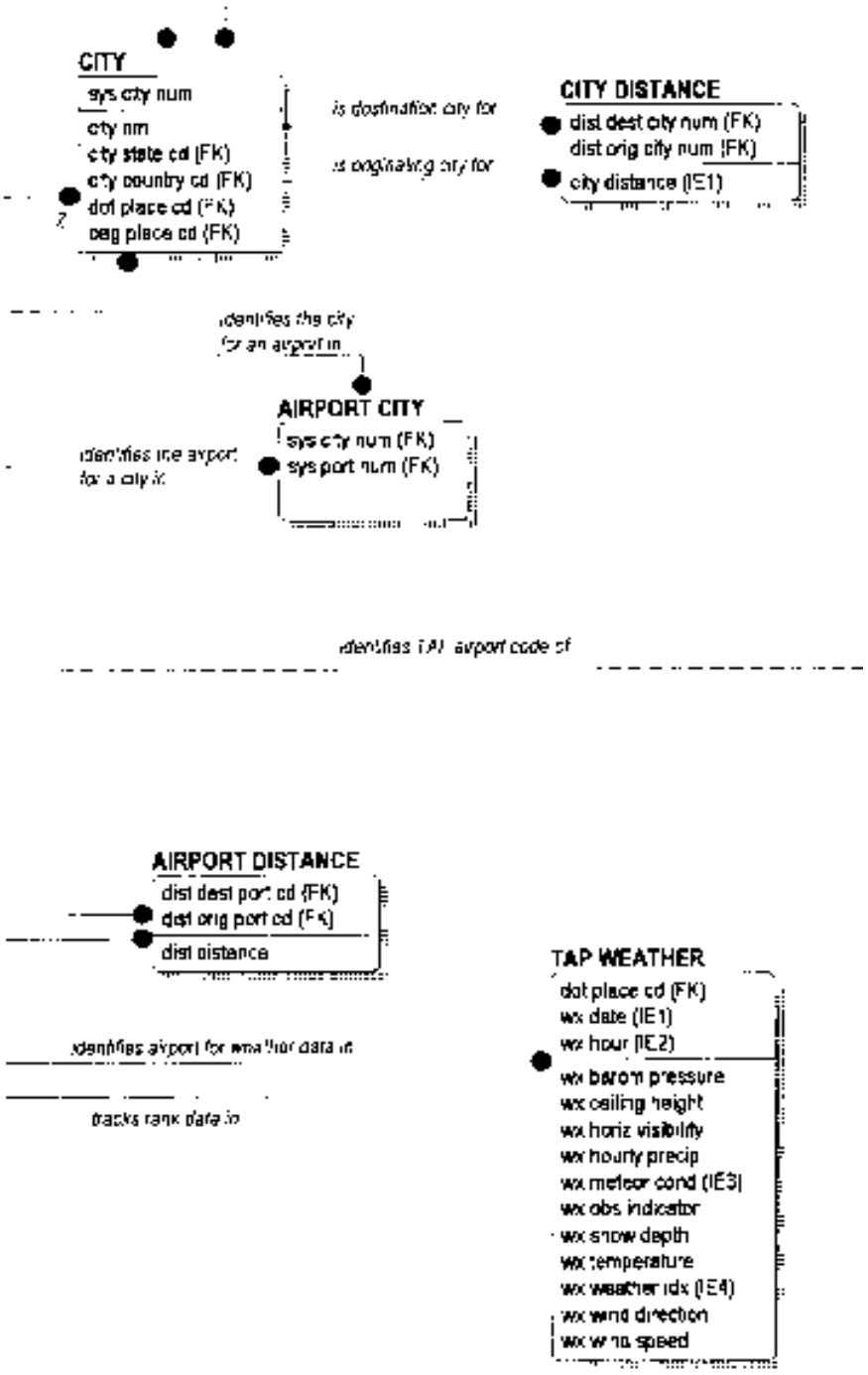


Figure A-2. QRS Database Entity-Relationship Diagram (Con't.)

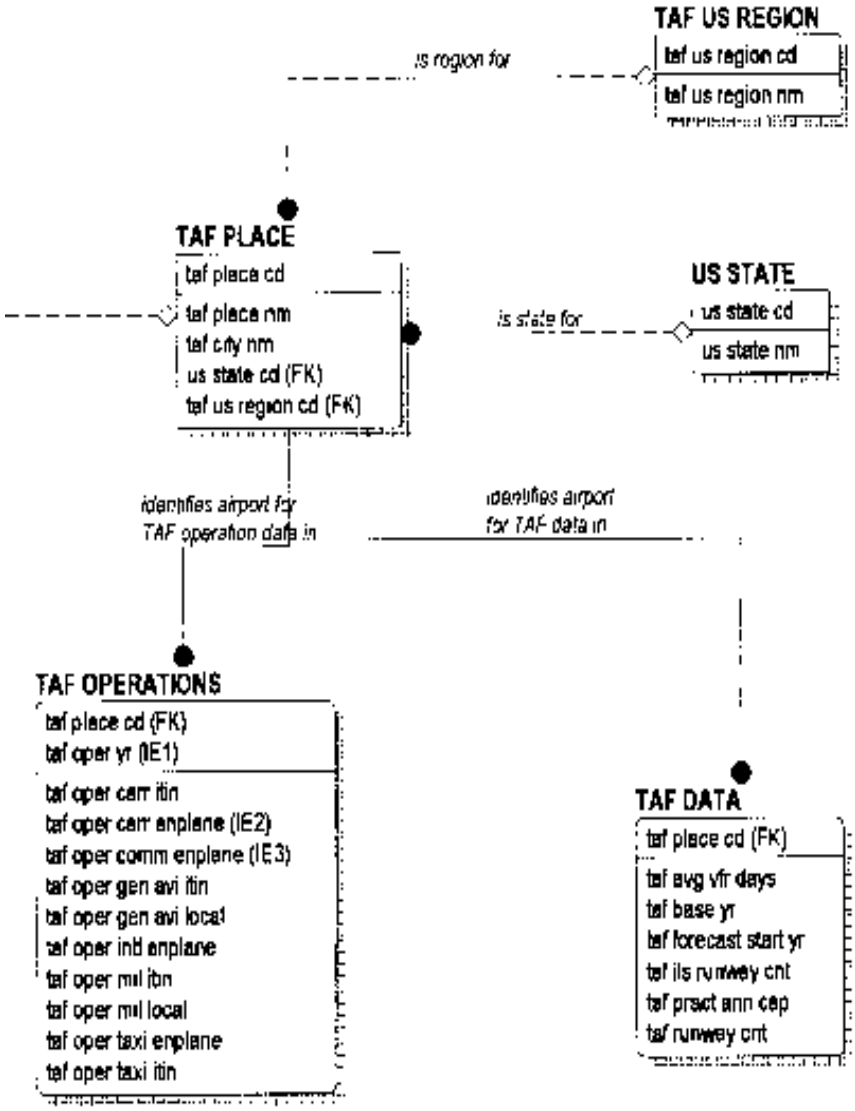


Figure A-2. QRS Database Entity-Relationship Diagram (Con't.)

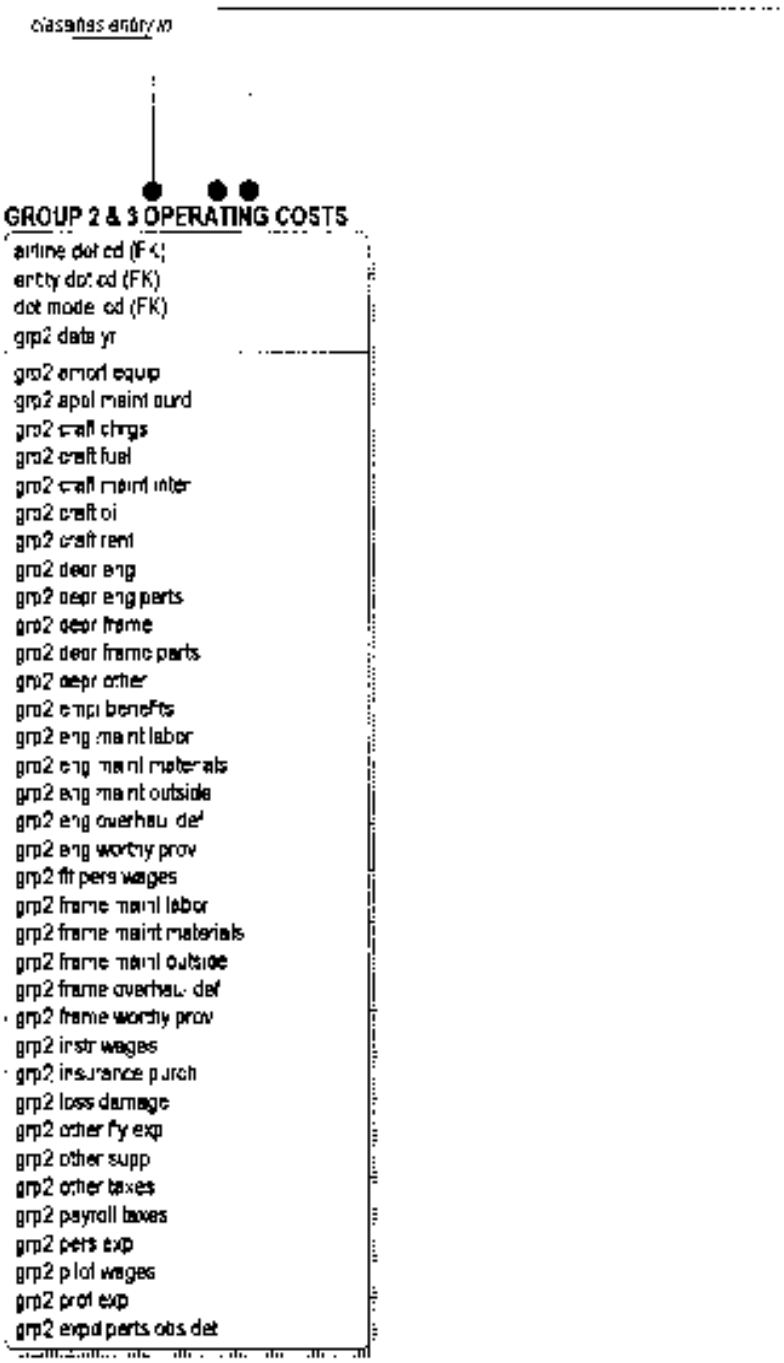


Figure A-2. QRS Database Entity-Relationship Diagram (Con't.)

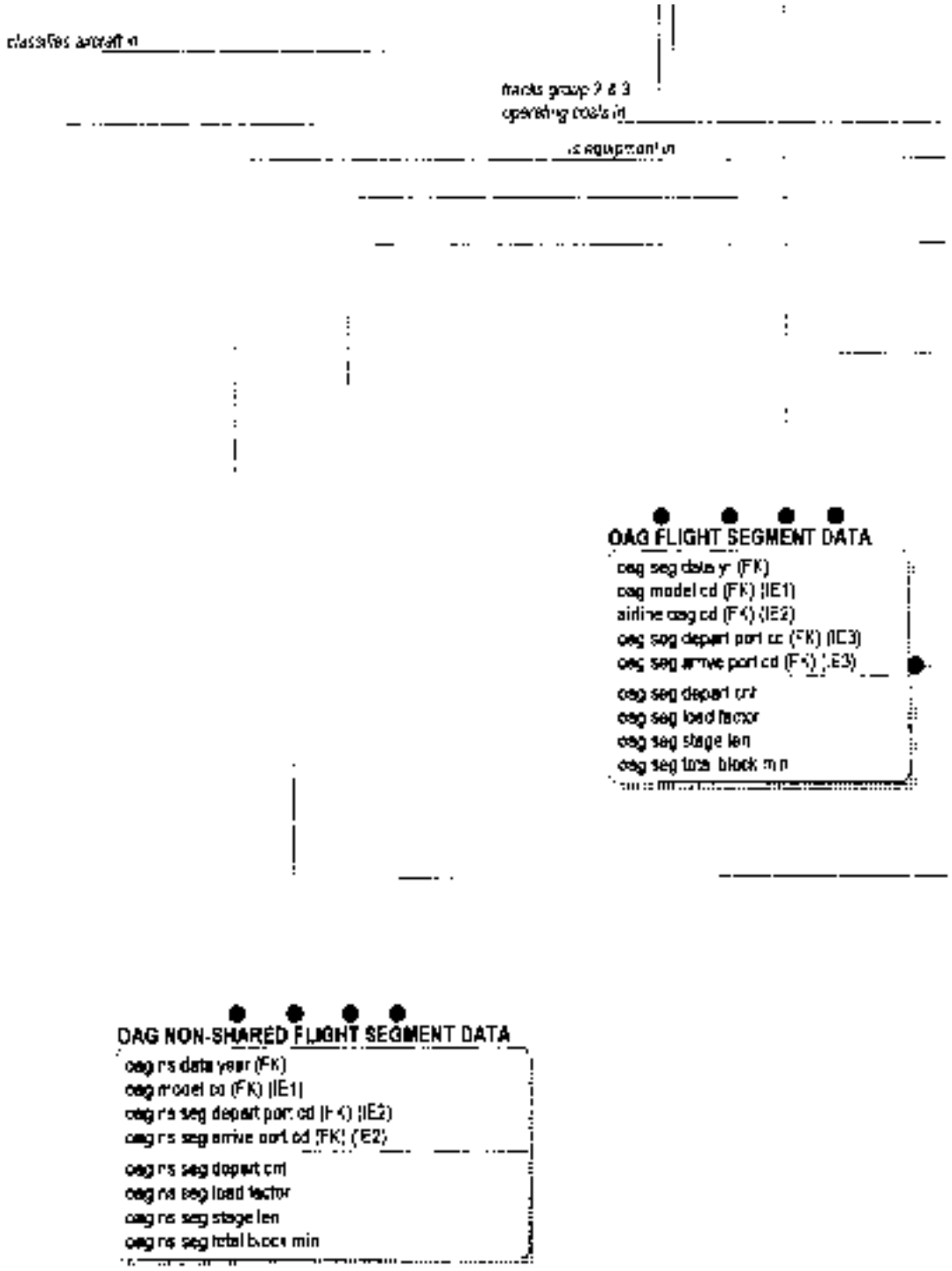


Figure A-2. QRS Database Entity-Relationship Diagram (Con't.)

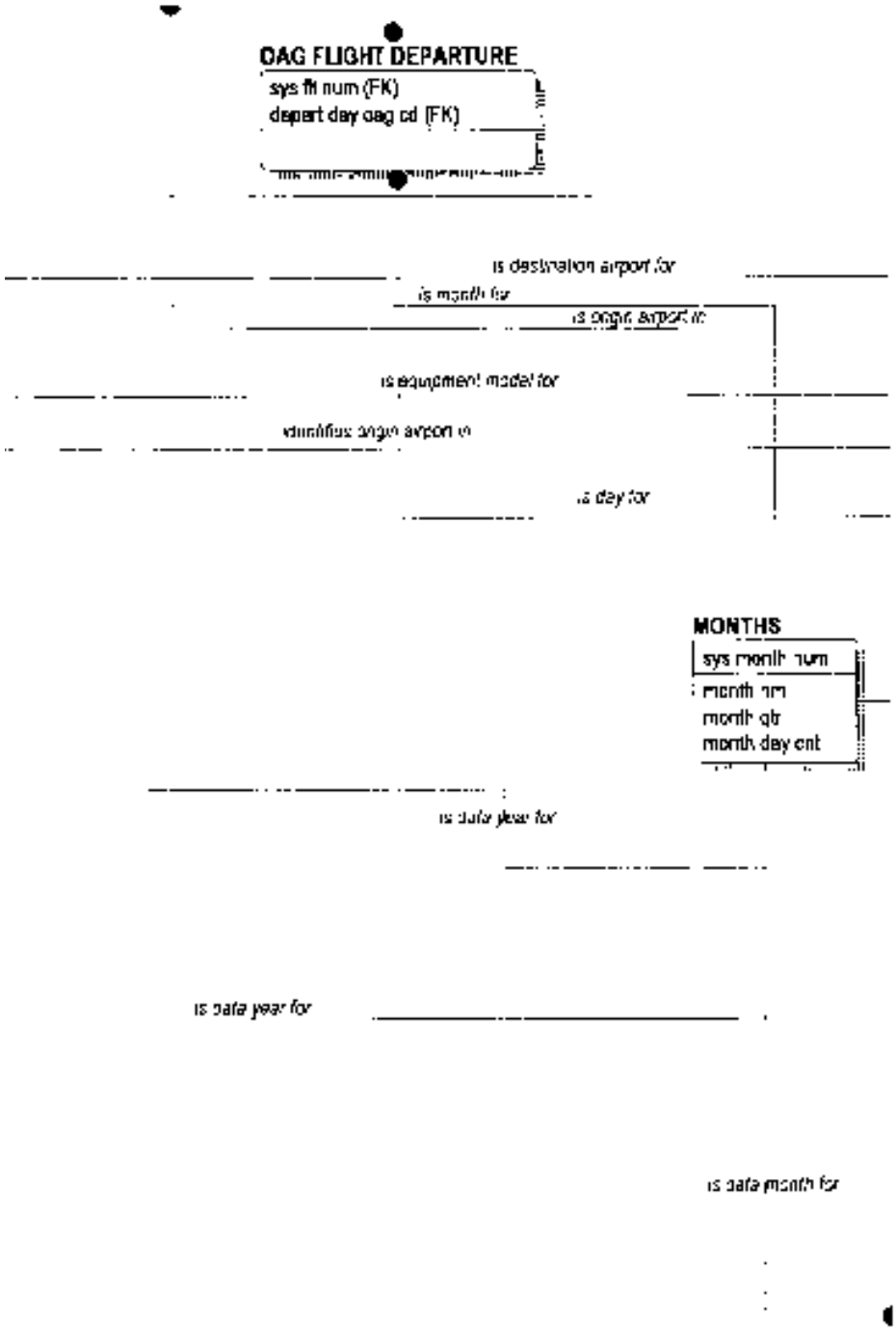


Figure A-2. QRS Database Entity-Relationship Diagram (Con't.)

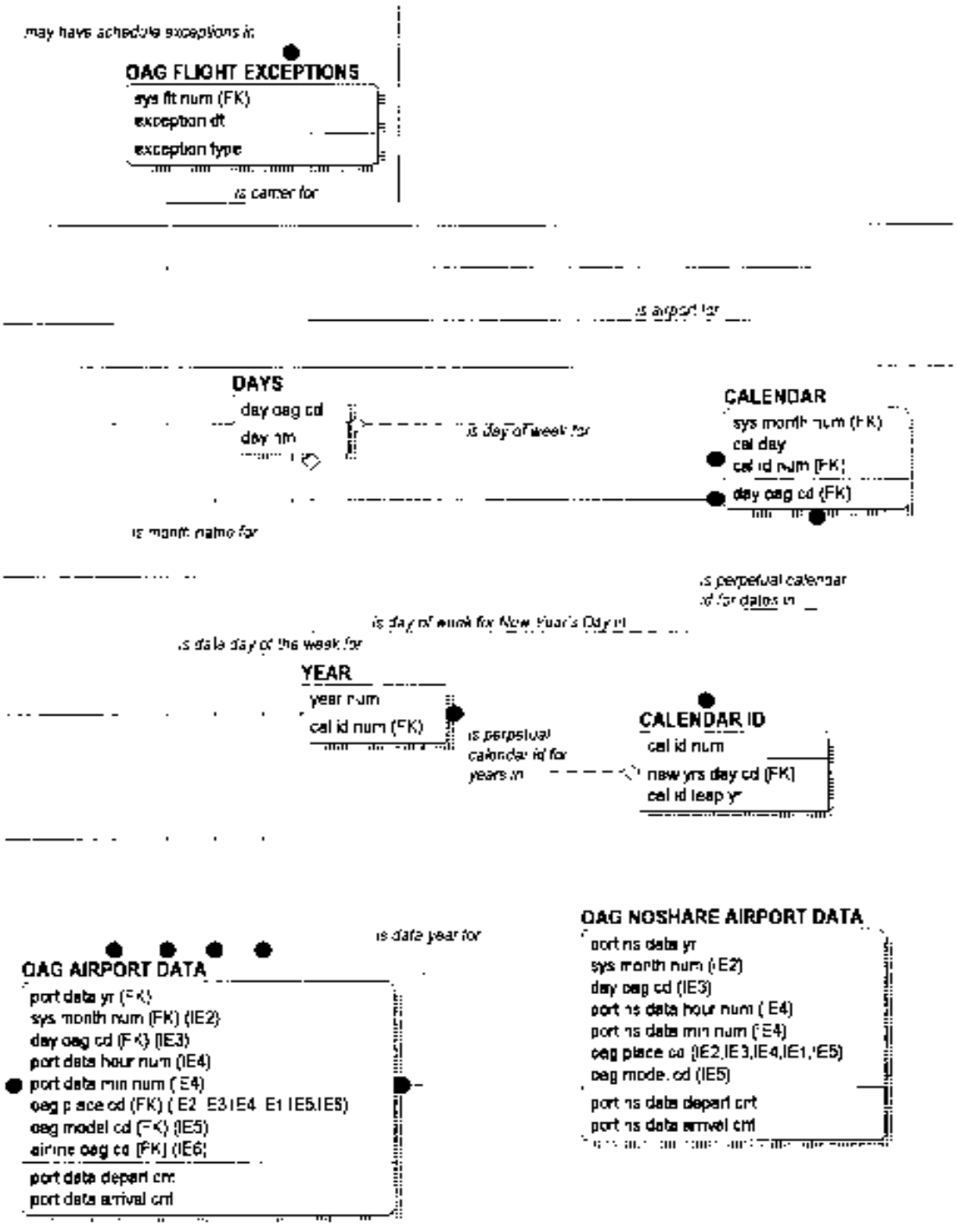


Figure A-2. QRS Database Entity-Relationship Diagram (Con't.)

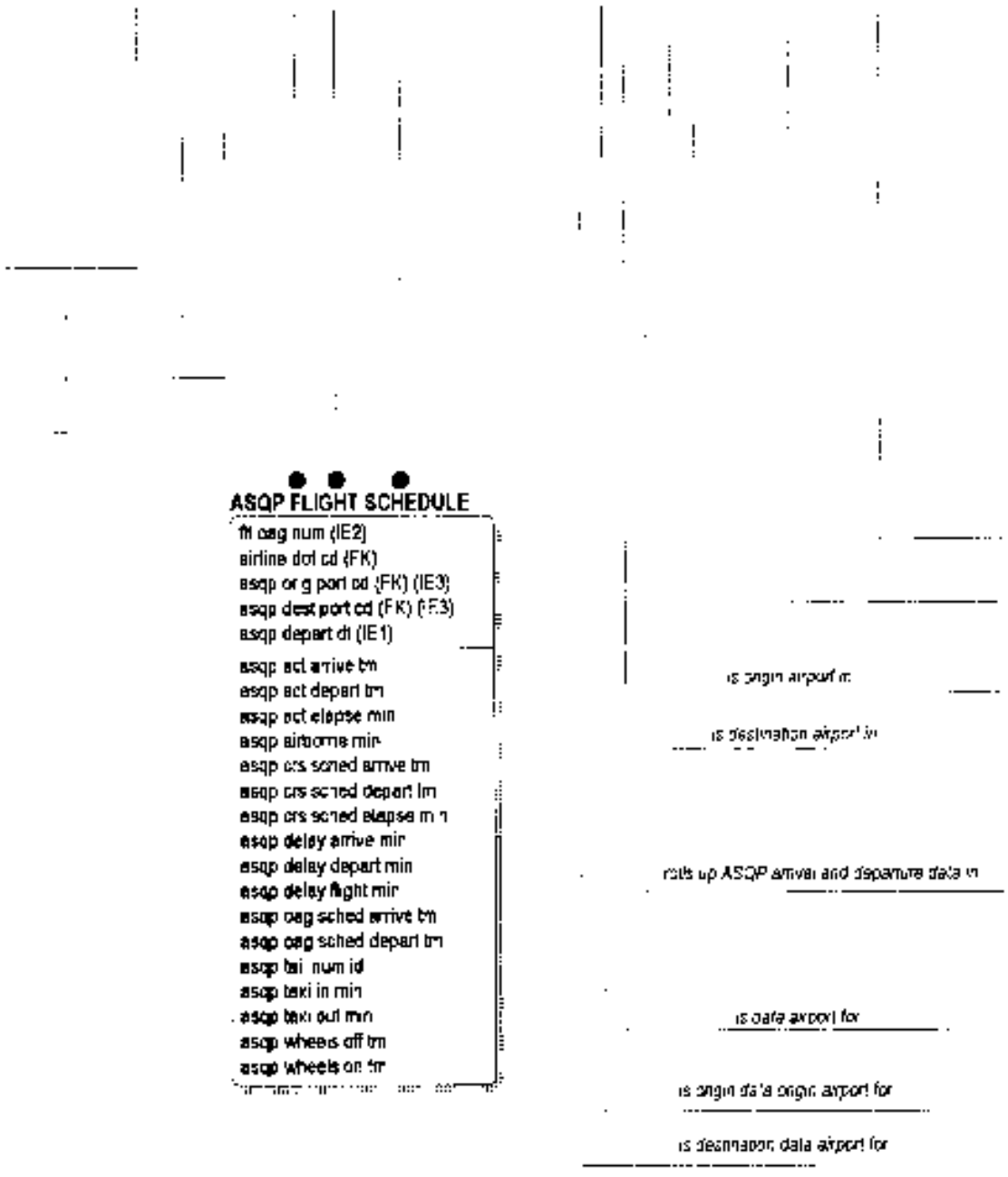
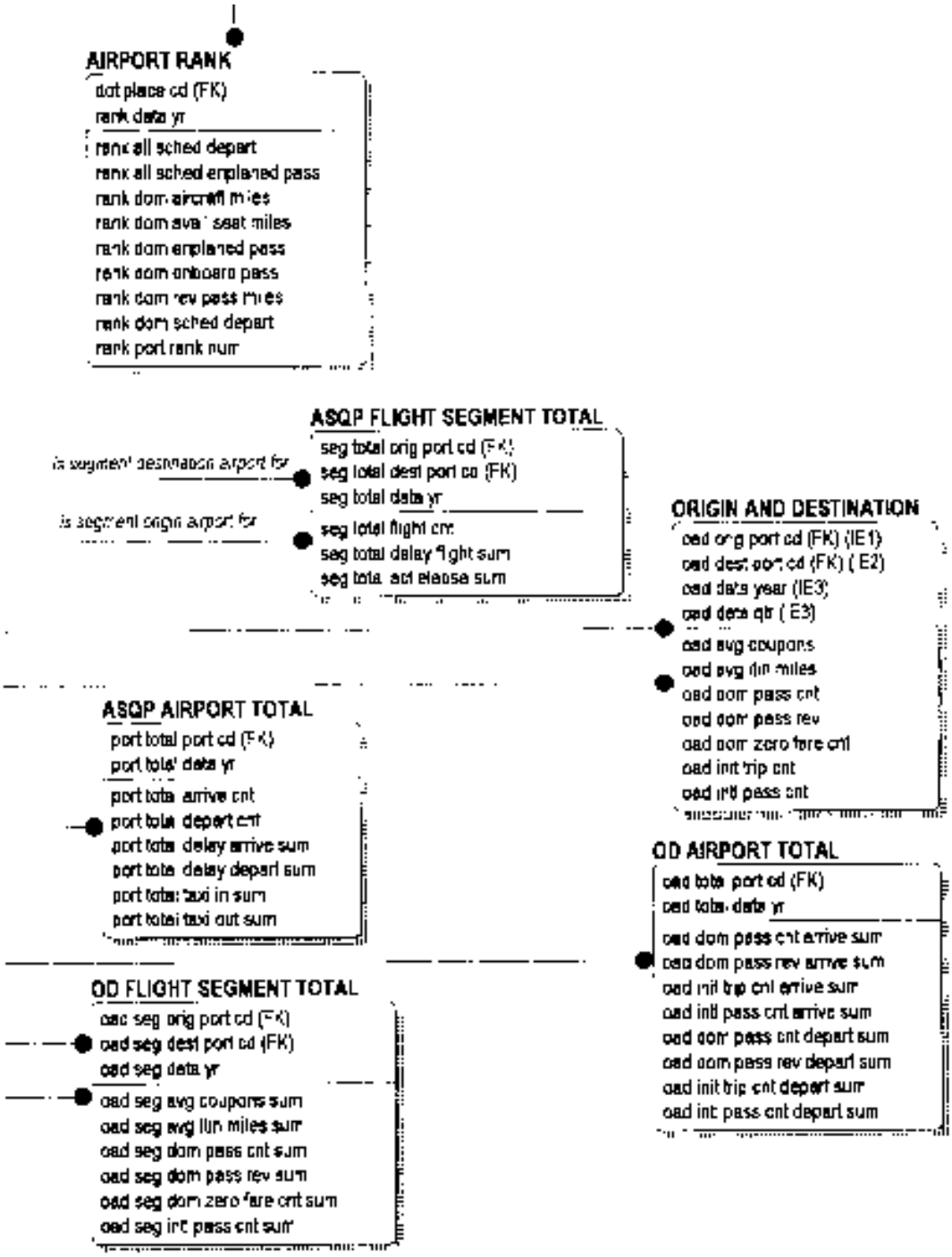
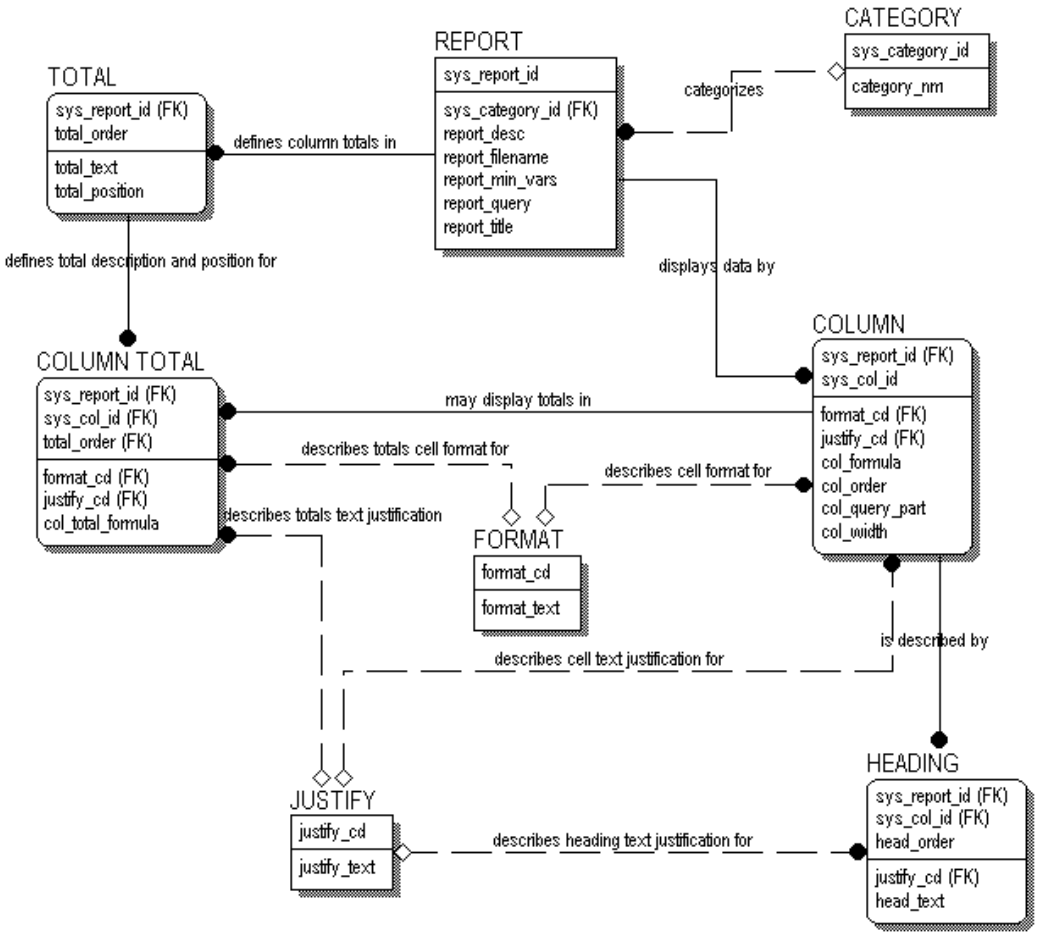


Figure A-2. QRS Database Entity-Relationship Diagram (Con't.)



REPORT SPECIFICATION DATABASE ENTITY—RELATIONSHIP DIAGRAM

Figure A-3. Report Specification Database Entity-Relationship Diagram



Appendix B
Unit Test Procedures

UNIT TEST PROCEDURES FOR REPORT SPECIFICATION PROGRAM

For each situation listed below, we have prepared a sample report specification file that contains that situation. When the command line is executed, the program should produce the expected error message. If the message is produced, an OK is placed in the result column. If the message is not produced, then a fail is placed in the result column.

Table B-1. Unit Test Procedures for Report Specification Program

Situation	Command Line	Expected Error Message	Result
no input file	rs foo	Could Not Open 'foo' for input.	OK
file too long	rs long1	The Report Specification File contains more than 512 lines. Program Aborting.	OK
line too long	rs long2	Report Specification file contains a line with 177 characters. The maximum allowable line is 101 characters. The line will be ignored.	OK
no sections	rs nosect	No '.BEGIN TITLE' found. No '.END TITLE' found. and so on for each section.	OK
.END before .BEGIN	rs endbefbeg	'.END TITLE' cannot preceed '.BEGIN TITLE'.	OK
empty section	rs blank	Section 'TITLE' cannot be empty. Section 'FILENAME' cannot be empty. Section 'SQL' cannot be empty.	OK
intertwined defs	rs intertwine	The definition for sections 'TITLE' and 'FILENAME' are inter-twined.	OK
two line filename	rs twolinefilename	'FILENAME' section can only contain one line.	OK
filename too long	rs filenametoolong	Filename can be at most 8 characters (no extension).	OK

Table B-1. Unit Test Procedures for Report Specification Program (Con't.)

Situation	Command Line	Expected Error Message	Result
report title too long	rs reporttitle-toolong	The Report Title cannot exceed 128 characters.	OK
bad heading	rs badhead-ing1	Bad Heading: 'X1C:'	OK
bad heading	rs badhead-ing2	Badly formed Heading Statement: 'H1C'	OK
bad justification in heading	rs hbadjust	Justification Code 'X' is invalid in Head-ing 'H1X:'	OK
bad total desc: does not begin with T	rs tdesc1	Total Description 'X1:TOP:Total' does not begin with 'T'.	OK
bad total desc: bad total order	rs tdesc2	Total Description 'T:TOP:Total' has bad total order number.	OK
bad total desc: to-tal number is re-used	rs tdesc3	Total Description 'T1:TOP:Total' has order number '1'. This order number was previously defined.	OK
bad total desc: no top or bottom	rs tdesc4	Total Description 'T1:' doesn't contain :TOP or :BOT.	OK
bad total: total or-der number	rs total1	Bad Total: Total Order Number in 'T:C1=@SUM~C0'	OK
bad total: total or-der number was't described	rs total2	Total Order Number of '2' in 'T2:C1=@SUM~C0' was not described in TOTALDESC.	OK
bad total, no colon	rs total3	Bad Total: no ':' in 'T1C1=@SUM~C0'	OK
bad total, no :C	rs total4	Bad Total: no ':C' in 'T1:X1=@SUM~C0'	OK
bad total, bad col-umn order number	rs total5	Bad Total: Column Order Number in 'T1:C=@SUM~C0'	OK
bad total, format code too long	rs total6	Format code 'C00' on Total Line 'T1:C1=@SUM~C00' is not 2 characters.	OK
bad total: invalid format code	rs total7	Format code 'CX' is invalid on Total Line 'T1:C1=@SUM~CX'	OK
bad total: invalid justification code	rs total8	Justify code 'X' is invalid on Total Line 'T1:C1X=@SUM~C0'	OK
bad total	rs total9	Total '1:C1=@SUM~C0' does not begin with T.	OK
too many columns	rs maxcol	The maximum allowable number of col-umns (100) has been exceeded.	OK
bad column	rs col1	Bad Column Number in 'C:#1'	OK

Table B-1. Unit Test Procedures for Report Specification Program (Con't.)

Situation	Command Line	Expected Error Message	Result
bad width	rs col2	Badly formed Width Statement: 'W1'	
bad format in column	rs col3	Format code 'C00' on Column Line 'C1:#1~C00' is not 2 characters.	OK
bad format in column	rs col4	Format code 'CX' is invalid on Column Line 'C1:#1~CX'	OK
bad column, no colon	rs col5	Badly formed Column: 'C1#1~C0'	OK
bad justify in column	rs col6	Justify code 'X' is invalid on Column Line 'C1X:#1~C0'	OK
bad column: no number after :	rs col7	Badly formed Column: 'C1:1~C0' -- '#' must follow ':'	OK
bad column	rs col8	Column '1:#1~C0' does not begin with C or I.	OK
no report to delete	rs -d nothere	There is no report 'NOTHERE' in the database.	OK
bad password	enter a bad password	Could not USE database. Are your login and password correct?	OK
good report	rs good	Report specification 'good' with filename 'good' has been successfully stored in the database.	OK
see list	rs -l	Gives listing of all reports stored in the database	OK
optional category and description can be supplied	rs catdesc	Report specification 'catdesc' with filename 'catdesc' has been successfully stored in the database.	OK
verify that category and description were stored	rs -e catdesc out1 more out1	Report 'CATDESC' has been exported to 'out1'. Verify that out1 contains a category and description section.	OK

UNIT TEST PROCEDURES FOR REPORT GENERATION PROGRAM

For each situation listed below, we prepared a sample report specification file that contains that situation. When the command line is executed, the program should produce the expected error message. If the message is produced, an OK is placed in the result column. If the message is not produced, then a fail is placed in the result column.

Table B-2. Unit Test Procedures for Report Generation Program

Situation	Command Line	Expected Error Message	Result
First Arg not slk or dat	rgen -abc foo	First argument must be -slk or -dat.	OK
Report not found	rgen -slk foo	There is no report 'FOO' in the database.	OK
Output filename has extension	rgen -slk example1 foo.out	Output filename cannot have an extension.	OK
Good report - slk	rgen -slk example1	Report 'EXAMPLE1' has been generated to 'example1.slk'	OK
Good report -dat	rgen -dat example1	Report 'EXAMPLE1' has been exported to 'example1.dat'	OK
Error in .PRE section	rgen -slk example2	Error messages from the server... Error executing .PRE line 'SELECT ... Error executing .PRE section. ABORTING query. Could not execute the report query. Error Generating Rows. There was an error during the generation program.	OK
Error in .RESULT section	rgen -slk example3	Error messages from the server... The report's SQL has an error: select * rom tempdb..examp1 Could not execute the report query. Error Generating Rows. There was an error during the generation program.	OK

Table B-2. Unit Test Procedures for Report Generation Program (Con't.)

Situation	Command Line	Expected Error Message	Result
Error in .POST section	rgen -slk example4	Error executing .POST line 'drop able tempdb..examp1 Error executing .POST section. Could not execute the report query. Error Generating Rows. There was an error during the generation program.	OK
Parameters applied correctly	diff example1.slk example6.slk	<no output> -- the two files are identical.	OK
Not all parameters are supplied	rgen -slk example6 -year=1993	Warning: Variable 'CUTOFF' in SQL, but no value given, query will not be restricted on 'CUTOFF'. Report 'EXAMPLE6' has been generated to 'example6.slk'.	OK
bad password	enter a bad password	Could not USE database. Are your login and password correct?	OK

UNIT TEST PROCEDURES FOR X WINDOW SYSTEM REPORT VIEWER

For each situation listed below, we prepared a sample report specification file that contains that situation. When the command line is executed, the program should produce the expected error message. If the message is produced, an OK is placed in the result column. If the message is not produced, then a fail is placed in the result column.

Table B-3. Unit Test Procedures for X Window System Report Viewer

Procedure Number	Test Procedure	Data File	Test Results	Comments	Retest Results
1.	Program startup				
1.1.	Test command line options				
1.1.1.	No options	None	OK		
1.1.2.	-file: data filename				
1.1.2.1.	Test with valid filename	utest1.dat	OK		
1.1.2.2.	Test with invalid filename	bad filename	OK		
1.1.3.	-pr, -printer: printer command	None; utest1.dat	OK		
1.1.4.	-help, anything else: usage help	None; utest1.dat	OK		
1.2.	Test resource file options				
1.2.1.	Test resource file in /usr/lib/X11/app-defaults/XRview	utest1.dat	OK		
1.2.2.	Test resource file in $HOME/XRview	utest1.dat	OK		
1.2.3.	*file: <filename>: data filename	utest1.dat	OK		
1.2.3.1.	Test for invalid filename	utest1.dat	OK		
1.2.4.	*printer: <print command>: printer command				
1.3.	Test resource precedence				
1.3.1.	app-defaults resource file (lowest) to command line resource (highest)	utest1.dat	OK		
2.	Menu functions				
2.1.	File Menu				
2.1.1.	Open				

Table B-3. Unit Test Procedures for X Window System Report Viewer (Con't.)

Procedure Number	Test Procedure	Data File	Test Results	Comments	Retest Results
2.1.2.	Close				
2.1.2.1.	Test if disabled when file is not loaded	None	OK		
2.1.2.2.	Test if enabled when file is loaded	utest1.dat	OK		
2.1.3.	Save As				
2.1.3.1.	Test if disabled when file is not loaded	None	OK		
2.1.3.2.	Test if enabled when file is loaded	utest1.dat	OK		
2.1.3.3.	Test that save is made to named file	utest1.dat	OK		
2.1.3.4.	Test for correct default file name	utest1.dat	OK		
2.1.3.5.	Test for proper response if no file name is entered	utest1.dat	OK		
2.1.3.6.	Test for prompt when overwriting existing file	utest1.dat	OK		
2.1.3.7.	Test for correct saved format for Save text options	utest1.dat	OK		
2.1.3.7.1.	Formatted cell text	utest1.dat	fail	newlines in headers not handled properly	OK
2.1.3.7.2.	Unformatted cell values	utest1.dat	OK		
2.1.3.7.3.	Tab delimited	utest1.dat	OK		
2.1.3.7.4.	Comma delimited	utest1.dat	OK		
2.1.4.	Print				
2.1.4.1.	Test if disabled when file is not loaded	None	OK		
2.1.4.2.	Test if enabled when file is loaded	utest1.dat	OK		
2.1.4.3.	Test for correct output on Print to Printer	print[1-4].dat			
2.1.4.3.1.	Print All Pages		OK		
2.1.4.3.2.	Print Page Range		OK		
2.1.4.4.	Test for correct output on Print to File	print[1-4].dat			
2.1.4.4.1.	Print All Pages		OK		
2.1.4.4.2.	Print Page Range		OK		
2.1.4.4.3.	Test for prompt when overwriting existing file				

Table B-3. Unit Test Procedures for X Window System Report Viewer (Con't.)

Procedure Number	Test Procedure	Data File	Test Results	Comments	Retest Results
2.1.4.4.4.	Test for correct default file name		OK		
2.1.4.4.5.	Test for missing filename		OK		
2.1.5.	Exit				
2.1.5.1.	Test for confirmation dialog	None; utest1.dat	OK		
2.1.5.1.1.	OK - exits program normally	None; utest1.dat	OK		
2.1.5.1.2.	Cancel - closes dialog, program continues normally	None; utest1.dat	OK		
2.2.	Display Menu				
2.2.1.	Test radio behavior of toggle buttons	utest1.dat	OK		
2.2.2.	Formatted				
2.2.2.1.	Test if disabled when file is not loaded	None	OK		
2.2.2.2.	Test if enabled when file is loaded	utest1.dat	OK		
2.2.2.3.	Test that displayed format is the same as the specified format	utest1.dat	OK		
2.2.3.	Unformatted				
2.2.3.1.	Test if disabled when file is not loaded	None	OK		
2.2.3.2.	Test if enabled when file is loaded	utest1.dat	OK		
2.2.3.3.	Test that displayed values are the same as the data values in report text	utest1.dat	OK		
2.2.4.	Help Menu	utest1.dat			
2.2.4.1.	Program Help		OK	Dialog works; no content in help	
2.2.4.2.	Keyboard Help		OK	Dialog works; no content in help	
2.2.4.3.	About		OK		
3.	Loading report files				
3.1.	Title specifications				
3.1.1.	Test handling of single and multiple row titles	title[1-5].dat	OK		
3.2.	Column heading specifications				

Table B-3. Unit Test Procedures for X Window System Report Viewer (Con't.)

Procedure Number	Test Procedure	Data File	Test Results	Comments	Retest Results
3.2.1.	Test condition where specification line is malformed	heading1.dat	OK	Omits heading title; this error will likely never occur with generated data files	
3.2.2.	Test condition where heading specification for a column is missing (no error)	heading2.dat	OK		
3.2.3.	Test condition where heading specifications are out of column order (no error)	heading3.dat	OK		
3.3.	Column format specifications				
3.3.1.	Test condition where specification line is malformed				
3.3.1.1.	No width line	column1.dat	OK		
3.3.1.2.	Transposed fields	column2.dat	OK	Loads okay but column is (of course) corrupted; this error will likely never occur with generated data files	
3.3.1.3.	Missing fields	column3.dat	OK		
3.3.2.	Test condition where specification lines are out of column order (no error)	column4.dat	OK		
3.3.3.	Test conditions where the number of column format specifications do not equal the number of column heading specifications				
3.3.3.1.	number of heading specs > number of format specs (error)	column5.dat	OK	error reported	
3.3.3.2.	number of heading specs < number of format specs (no error)	heading2.dat	OK		
3.3.4.	Test data display formatting	format1.dat	OK		
3.3.4.1.	comma-formatted numbers (C)				
3.3.4.1.1.	Test that precision is the precision specified		OK		
3.3.4.1.2.	Test that value is correct after formatting		OK		

Table B-3. Unit Test Procedures for X Window System Report Viewer (Con't.)

Procedure Number	Test Procedure	Data File	Test Results	Comments	Retest Results
3.3.4.1.3.	Test that text in the column is not formatted		OK		
3.3.4.2.	percent-formatted numbers (P)				
3.3.4.2.1.	Test that precision is the precision specified		OK		
3.3.4.2.2.	Test that value is correct after formatting		OK		
3.3.4.2.3.	Test that text in the column is not formatted		OK		
3.3.4.3.	unformatted number (U)				
3.3.4.3.1.	Test that display value is the same as data value		OK		
3.3.4.3.2.	Test that text in the column is not formatted		OK		
3.3.4.4.	text (T)				
3.3.4.4.1.	Test that display value is the same as data value		OK		
3.3.4.5.	Text justification (L, C, R)				
3.3.4.5.1.	Test that displayed justification is the justification specified for the column		OK		
3.4.	Totals description specifications				
3.4.1.	Test condition where specification line is malformed				
3.4.1.1.	Transposed fields	tdesc1.dat	fail	This error will likely never occur with generated data files; failure (crash) corrected	OK
3.4.1.2.	Missing fields	tdesc2.dat	OK		
3.4.2.	Test condition where specification lines are out of column order (no error)	tdesc3.dat	OK		
3.5.	Totals rows specifications				
3.5.1.	Test condition where specification line is malformed				
3.5.1.1.	Transposed fields	totals1.dat	OK		
3.5.1.2.	Missing fields	totals2.dat	fail	This error will likely never occur with generated data files	not fixed

Table B-3. Unit Test Procedures for X Window System Report Viewer (Con't.)

Procedure Number	Test Procedure	Data File	Test Results	Comments	Retest Results
3.5.2.	Test condition where specification lines are out of order (no error)	totals3.dat	OK		
3.5.3.	Test condition where row number reference is not in totals description specification		OK	This error will likely never occur with generated data files	
3.6.	Data rows				
3.6.1.	Test condition where data line is malformed	data1.dat	fails	This error will likely never occur with generated data files	not fixed
3.7.	File error checking				
3.7.1.	Test conditions where specification sections are malformed	fcheck1.dat	OK		
3.7.2.	Test conditions where specification sections are missing	fcheck2.dat	OK		
4.	Formulas				
4.1.	Column formulas				
4.1.1.	Test conditions where referenced columns are invalid	formula1.dat	OK		
4.1.2.	Test conditions where referenced totals are invalid	formula2.dat	fails		OK
4.1.3.	Test that the correct response is received for invalid or circular references	formula3.dat	fails		OK
4.1.4.	Test that divide by zero errors are handled properly	formula3.dat	OK		
4.2.	Totals formulas				
4.2.1.	Test conditions where referenced column values are invalid	formula4.dat	OK		
4.2.2.	Test conditions where referenced totals values are invalid	formula5.dat	fails		OK
4.2.3.	Test that the correct response is received for invalid or circular references	formula6.dat	fails		OK
4.2.4.	Test that divide by zero errors are handled properly	formula6.dat	OK		
4.3.	Calculator functions	functions.dat			

Table B-3. Unit Test Procedures for X Window System Report Viewer (Con't.)

Procedure Number	Test Procedure	Data File	Test Results	Comments	Retest Results
4.3.1.	arithmetic operators (+, -, *, /)				
4.3.1.1.	Test that expressions are supported syntactically		OK		
4.3.1.2.	Test that the correct results are returned		OK		
4.3.2.	comparison operators (=, <>, <=, <, >=, >)				
4.3.2.1.	Test that expressions are supported syntactically		OK		
4.3.2.2.	Test evaluation of expressions during the @IF function test		OK		
4.3.3.	Logical operators (AND, OR)				
4.3.3.1.	Test that expressions are supported syntactically		OK		
4.3.3.2.	Test evaluation of expressions during the @IF function test		OK		
4.3.4.	unary minus (-)				
4.3.4.1.	Test that expressions are supported syntactically		OK		
4.3.4.2.	Test that the correct results are returned		OK		
4.3.5.	precedence operator (parentheses)				
4.3.5.1.	Test that expressions are supported syntactically		OK		
4.3.5.2.	Test that the correct results are returned		OK		
4.3.6.	math functions (@abs, @acos, @asin, @atan, @ceil, @cos, @floor, @ln, @log, @pow, @sin, @sqrt, @tan)				
4.3.6.1.	Test that expressions are supported syntactically		OK		
4.3.6.2.	Test that the correct results are returned		OK		
4.3.7.	@IF (Boolean, then, else)				
4.3.7.1.	Test that expression is supported syntactically		OK		

Table B-3. Unit Test Procedures for X Window System Report Viewer (Con't.)

Procedure Number	Test Procedure	Data File	Test Results	Comments	Retest Results
4.3.7.2.	Test that Boolean expression is evaluated correctly		OK		
4.3.7.3.	Test that the 'then' expression is executed when Boolean expression is True		OK		
4.3.7.4.	Test that the 'else' expression is executed when Boolean expression is False		OK		
4.3.7.5.	Test that nested @IF expressions are correctly supported		OK		
4.4.	Columnwise functions				
4.4.1.	@sum				
4.4.1.1.	Test that expression is supported syntactically		OK		
4.4.1.2.	Test that resultant value is correct		OK		
4.4.2.	@AVG				
4.4.2.1.	Test that expression is supported syntactically		OK		
4.4.2.2.	Test that resultant value is correct		OK		
4.4.3.	@MAX				
4.4.3.1.	Test that expression is supported syntactically		OK		
4.4.3.2.	Test that resultant value is correct		OK		
4.4.4.	@MIN				
4.4.4.1.	Test that expression is supported syntactically		OK		
4.4.4.2.	Test that resultant value is correct		OK		

Appendix C
ASAC QRS Reports

This a table of all QRS reports, sorted by report category, includes the report name, report title, and last revision date for the report.

Table C-1. QRS Report Server Reports Sorted by Report Category

Category Name	Report Name	Report Title	Date of Last Revision
Airport Data	ASQP-AR1	ASQP Departure & Arrival Delays (ranked by total of departure and arrival delay)	10/31/96
Airport Data	ASQP-AR2	ASQP Departure & Arrival Delays (ranked by average departure delay)	10/29/96
Airport Data	ASQP-AR3	ASQP Departure & Arrival Delays (ranked by average arrival delay)	10/31/96
Airport Data	ASQP-RAT	ASQP and T-3 Ratios and Scaling Factors (sorted by airport code)	10/24/96
Airport Data	OAG-AIR3	OAG Airport Statistics (ranked by OAG Departures)	7/10/96
Airport Data	OAG-AIR4	OAG Airport Statistics (ranked by revenue passenger miles)	7/10/96
Airport Data	OAG-AIR5	OAG Airport Statistics (ranked by number of passengers)	7/10/96
Airport Data	OAG-AP1	OAG Airport Departures - Equipment Level (sorted by aircraft type)	7/18/96
Airport Data	OAG-AP2	OAG Airport Departures - Carrier Level (sorted by carrier name)	8/2/96
Airport Data	OAG-AP3	ASAC Airport Departures Forecast - Equipment Level (sorted by aircraft type)	10/25/96
Airport Data	OAG-TMDC	OAG Daily Departures & Arrivals - Specific Carrier Statistically Average Day for a Specific Day of the Week	5/30/96
Airport Data	OAG-TMDE	OAG Daily Departures & Arrivals - Specific Equipment Statistically Average Day for a Specific Day of the Week	5/30/96
Airport Data	OAG-TMDG	OAG Daily Departures & Arrivals Statistically Average Day for a Specific Day of the Week	5/30/96

Table C-1. QRS Report Server Reports Sorted by Report Category (Con't.)

Category Name	Report Name	Report Title	Date of Last Revision
Airport Data	OAG-TMMG	OAG Daily Departures & Arrivals Statistically Average Day for a Specific Month	5/30/96
Airport Data	OAG-TMYC	OAG Daily Departures & Arrivals - Specific Carrier Statistically Average Day for 1993	5/30/96
Airport Data	OAG-TMYE	OAG Daily Departures & Arrivals - Specific Equipment Statistically Average Day for 1993	5/30/96
Airport Data	OAG-TMYG	OAG Daily Departures & Arrivals Statistically Average Day for 1993	5/30/96
Airport Data	RNK-DEP	DOT Airport Statistics (ranked by T-3 scheduled departures)	2/29/96
Airport Data	RNK-ENP	DOT Airport Statistics (ranked by T-3 enplaned passengers)	2/29/96
Airport Data	RNK-RPM	DOT Airport Statistics (ranked by T-100 revenue passenger miles)	2/29/96
Airport Data	TAF-1	TAF Operations - One Airport for All Years (sorted by year)	10/25/96
Airport Data	TAF-2	TAF Operations - All Airports for One Year (ranked by total operations)	10/25/96
Airport Data	TAF-3	TAF Airport Data (ranked by practical annual capacity)	10/25/96
Carrier Data	AI3	Aircraft Inventory by Carrier (ranked by inventory count)	4/16/96
Carrier Data	AI4	Aircraft Inventory for a Specific Carrier (ranked by inventory count)	5/30/96
Carrier Data	B43-CA1	B43 Aircraft Inventory - Distribution of Aircraft (for a given carrier)	10/28/96
Carrier Data	BS1	Air Carrier Balance Sheet Information (ranked by net stockholders' equity)	2/29/96
Carrier Data	DFSD-CA1	Flight Segment Means & Standard Deviations - Carrier Level (ranked by stage length)	2/29/96
Carrier Data	DOR-CAR	Direct Operating Cost Ratios - Carrier Level (sorted by carrier name)	2/29/96
Carrier Data	G1OC	Air Carrier Group 1 Operating Costs (sorted by carrier name)	4/17/96

Table C-1. QRS Report Server Reports Sorted by Report Category (Con't.)

Category Name	Report Name	Report Title	Date of Last Revision
Carrier Data	G23OC	Air Carrier Group 2 and 3 Operating Costs (sorted by carrier name)	4/17/96
Carrier Data	OAG-CA1	OAG Carrier Level Data - Passenger Aircraft (sorted by carrier name)	2/29/96
Carrier Data	OAG-CA2	OAG Carrier Level Data - Cargo Aircraft (sorted by carrier name)	2/29/96
Carrier Data	OAG-CA3	Equipment-Specific Operational Data for a Given Carrier (ranked by revenue passenger miles)	5/7/96
Carrier Data	OAG-CA4	Airport-Specific Operational Data for a Given Carrier (ranked by revenue passenger miles)	7/18/96
Carrier Data	OPRATCR1	Air Carrier Operating Ratios - Scheduled Airlines (sorted by carrier name)	2/29/96
Carrier Data	OPRATCR2	Air Carrier Operating Ratios - Other Airlines (sorted by carrier name)	2/29/96
Carrier Data	PL	Air Carrier Profit & Loss Information (sorted by carrier name)	4/17/96
Carrier Data	PM1-CAR	Productivity Measures - Carrier Level (sorted by carrier name)	4/17/96
Carrier Data	PROFRAT	Air Carrier Profitability Ratios (sorted by carrier name)	2/29/96
Equipment Data	AI1	Aircraft Inventory by Model (ranked by inventory count)	4/16/96
Equipment Data	AI2	Aircraft Inventory for a Specific Model (ranked by inventory count)	4/16/96
Equipment Data	AI9	Aircraft Inventory for a Specific Model by Airline (ranked by inventory count)	5/29/96
Equipment Data	B43-EQ1	B43 Aircraft Inventory - Distribution of Carriers (for a given equipment code)	10/28/96
Equipment Data	COD-EQ1	Cost and Operational Data - Equipment Level (sorted by aircraft type, model name)	7/12/96
Equipment Data	DFSD-EQ1	Flight Segment Means & Standard Deviations - Equipment Level (ranked by stage length)	2/29/96
Equipment Data	DOR-EQ	Direct Operating Cost Ratios - Equipment Level (sorted by model name)	2/29/96

Table C-1. QRS Report Server Reports Sorted by Report Category (Con't.)

Category Name	Report Name	Report Title	Date of Last Revision
Equipment Data	OAG-EQ1	OAG Equipment Level Data - Passenger Aircraft (sorted by model name)	7/10/96
Equipment Data	OAG-EQ2	OAG Equipment Level Data - Cargo Aircraft (sorted by model name)	10/22/96
Equipment Data	PM1-EQ	Productivity Measures - Equipment Level (sorted by model name)	2/29/96
Flight Segment Data	ASQP-PA1	ASQP Flight Delays by Flight Segment (ranked by total flight delay minutes)	10/31/96
Flight Segment Data	DFSD-FS1	DOT Flight Segment Data - Equipment Level (sorted by model name)	2/29/96
Flight Segment Data	DFSD-FS2	DOT Flight Segment Data - Carrier Level (sorted by carrier name)	2/29/96
Flight Segment Data	DFSD-NUM	T-100 Top Flight Segments (ranked by flight count)	2/29/96
Flight Segment Data	DFSD-ONB	T-100 Top Flight Segments (ranked by number of passengers)	2/29/96
Flight Segment Data	DFSD-RPM	T-100 Top Flight Segments (ranked by revenue passenger miles)	2/29/96
Flight Segment Data	OAG-FS1	OAG Flight Segment Data - Equipment Level (ranked by revenue passenger miles)	7/10/96
Flight Segment Data	OAG-FS2	OAG Flight Segment Data - Carrier Level (ranked by revenue passenger miles)	6/27/96
Flight Segment Data	OAG-FS3	OAG Top Flight Segments (ranked by flight count)	7/10/96
Flight Segment Data	OAG-FS4	OAG Top Flight Segments (ranked by revenue passenger miles)	7/10/96
Flight Segment Data	OAG-FS5	OAG Top Flight Segments (ranked by number of passengers)	7/10/96
Jet Engine Data	AI5	Jet Engine Inventory (ranked by engine count)	4/16/96
Jet Engine Data	AI6	Jet Engine Inventory by Manufacturer (ranked by engine count)	4/16/96
Jet Engine Data	AI7	Distribution of Aircraft Powered by a Specific Engine (ranked by engine count)	4/16/96
Jet Engine Data	AI8	Distribution of Engines Mounted on a Specific Model (sorted by model and series)	4/16/96

Table C-1. QRS Report Server Reports Sorted by Report Category (Con't.)

Category Name	Report Name	Report Title	Date of Last Revision
Miscellaneous	ARLNCOD1	Carrier Codes and Names (sorted by carrier name)	2/29/96
Miscellaneous	ARLNCOD2	Carrier Codes and Names (sorted by carrier code)	2/29/96
Miscellaneous	DOT-COD1	DOT Codes and Place Names (sorted by place name)	2/29/96
Miscellaneous	OAG-COD1	OAG Codes and Place Names (sorted by place name)	2/29/96
Miscellaneous	TAF-COD1	TAF Codes and Place Names (sorted by place name)	10/25/96
Origin & Destination Data	OD-AP1	Origin & Destination - Airport Totals (ranked by ratio of inbound to outbound initiated trips)	10/18/96
Origin & Destination Data	OD-AP2	Origin & Destination - Airport Totals (ranked by O & D matrix enplaned passengers)	2/29/96
Origin & Destination Data	OD-AP3	Origin & Destination - Airport Totals (ranked by ratio of O & D to T-3)	2/29/96
Origin & Destination Data	OD-AP4	Origin & Destination - Airport Totals (ranked by sum of inbound and outbound international passengers)	2/29/96
Origin & Destination Data	OD-AP5	Origin & Destination - Airport Totals (ranked by outbound domestic passenger revenues)	4/23/96
Origin & Destination Data	OD-CT1	Origin & Destination - City Totals (ranked by ratio of inbound to outbound initiated trips)	11/14/96
Origin & Destination Data	OD-CT2	Origin & Destination - City Totals (ranked by O & D matrix enplaned passengers)	11/18/96
Origin & Destination Data	OD-CT3	Origin & Destination - City Totals (ranked by ratio of O & D to T-3)	11/18/96
Origin & Destination Data	OD-CT4	Origin & Destination - City Totals (ranked by sum of inbound and outbound international passengers)	11/18/96
Origin & Destination Data	OD-CT5	Origin & Destination - City Totals (ranked by outbound domestic passenger revenues)	11/18/96
Origin & Destination Data	ODFS-ACU	Origin & Destination - Airport Pairs (ranked by average coupons used)	2/29/96

Table C-1. QRS Report Server Reports Sorted by Report Category (Con't.)

Category Name	Report Name	Report Title	Date of Last Revision
Origin & Destination Data	ODFS-AF	Origin & Destination - Airport Pairs (ranked by average fare)	2/29/96
Origin & Destination Data	ODFS-CF	Origin & Destination - Airport Pairs (ranked by circuity factor)	2/29/96
Origin & Destination Data	ODFS-DOM	Origin & Destination - Airport Pairs (ranked by domestic passenger count)	2/29/96
Origin & Destination Data	ODFS-PZA	Origin & Destination - Airport Pairs (ranked by percent of zero fare passengers ascending)	2/29/96
Origin & Destination Data	ODFS-PZD	Origin & Destination - Airport Pairs (ranked by percent of zero fare passengers descending)	2/29/96
Origin & Destination Data	ODFS-REV	Origin & Destination - Airport Pairs (ranked by domestic passenger revenues)	2/29/96
Origin & Destination Data	ODFS-TY	Origin & Destination - Airport Pairs (ranked by traditional yield)	2/29/96

Appendix D
System Test Procedures

System testing was divided into four sections:

- RDBMS
- QRS
- System Information
- Administration.

Test procedures used for system testing are summarized in Table D-1.

As-run system test procedures follow:

Table D-1. Summary of QRS System Tests

Test Procedure	Test Procedure Title
RDBMS	
RDBMS001	QRS Database Analysis
RDBMS002	QRS Database Validity
RDBMS010	QRS Report Specification Database Analysis
RDBMS011	QRS Report Specification Database Validity
RDBMS020	Database Access
RDBMS030	RDBMS Concurrent Users
QRS	
QRS001	WWW Presentation and Editorial Consistency
QRS002	WWW Page Operation
QRS010	Report Specification Program Functionality—Windows
QRS020	Report Generation Program Functionality—Macintosh
QRS030	Report Viewer Download and Installation—HP
QRS031	Report Viewer Functionality—HP
QRS033	Report Viewer Download and Installation—Sun
QRS034	Report Viewer Functionality—Sun
QRS035	Report Viewer Download and Installation—SGI
QRS036	Report Viewer Functionality—SGI

Table D-1. Summary of QRS System Tests (Con't.)

Test Procedure	Test Procedure Title
System Information	
SI001	Help/Informational Text Accuracy
SI020	Error/Information/System Log Procedures and Validity
SI030	User Access, System Log Procedures and Validity
Administrative	
MBR001 MBR002	Server Maintenance Mode System Recovery

RDBMS001, QRS Database Analysis		
Test Procedure	**Expected Results**	**Actual Results**
1. Perform desktop analysis of the QRS Database model using the entity-relationship diagram and data dictionary generated by ERWin software.	See printout of database map and data dictionary	OK
2. Ensure abbreviations are used sparingly and are meaningful to the end-user.	Abbreviations are used sparingly and are meaningful to the end-user.	OK
3. Ensure extraneous objects are not present.	Extraneous objects are not present.	OK
4. Ensure data values do not differentiate or define entities or other attributes.	Data values do not differentiate or define entities or other attributes.	OK
5. Ensure data values are not modeled.	Data values are not modeled.	OK
6. Ensure attributes exist in the database once, except for foreign keys.	Attributes exist in the database once, except for foreign keys.	OK
7. Ensure no embedded attributes exist.	No embedded attributes exist.	OK
8. Ensure no entities are without attributes. Ensure no entities have only one attribute.	No entities are without attributes. No entities have only one attribute.	OK
9. Ensure data object names are meaningful and follow a uniform approach.	Data object names are meaningful and follow a uniform approach.	OK
Other Observations		
The QRS database seems to be well orders and structured.		

Date: 12/16/96 Initials: PR

RDBMS002, QRS Database Validity		
Test Procedure	**Expected Results**	**Actual Results**
1. Using ISQL, perform the following queries:		OK
2. SELECT sys_oper_num, sys_engine_num, dot_model_cd, craft_inven_series_nm, craft_inven_yr, craft_inven_cnt, craft_inven_num_eng_type FROM AIRCRAFT_INVENTORY WHERE sys_oper_num=1549 AND craft_inven_yr=1995 AND craft_inven_series_nm='625'	(1 row) 1549 10 625 200ER 1995 1 2	OK
3. SELECT sys_model_type_num, model_type_nm FROM AIRCRAFT_MODEL_TYPE	Eight rows: 1 None 2 Helicopter/STOL 3 Jet 4 Piston 5 Turboprop 6 Amphibian 7 Propeller 8 Road vehicle	OK
4. SELECT entity_dot_cd, entity_nm FROM AIRLINE_ENTITY	Six rows: A Atlantic Service D Domestic Service I International Service L Latin American Service P Pacific Service ^ Total Airline	OK
5. SELECT sys_oper_num, airline_oag_cd, airline_dot_cd FROM AIRLINE_OPERATOR WHERE airline_dot_cd ='UA'	(1 row) 142 UA UA	OK
6. SELECT sys_port_num, dot_place_cd, oag_place_cd, taf_place_cd FROM AIRPORT WHERE sys_port_num=4494	(1 row) 4494 BOS BOS BOS	OK
7. SELECT sys_city_num, sys_port_num FROM AIRPORT_CITY WHERE sys_city_num=4494	(2 rows) 4494 4279 4494 8409	OK
8. SELECT dist_dest_port_cd, dist_orig_port_cd, dist_distance FROM AIRPORT_DISTANCE WHERE dist_dest_port_cd='LAX' AND dist_orig_port_cd='BOS'	(1 row) LAX BOS 2611	OK
9. SELECT dot_place_cd, rank_data_yr, rank_all_sched_depart, rank_all_sched_enplaned_pass FROM AIRPORT_RANK WHERE dot_place_cd='HPN' AND rank_data_yr=1992	(1 row) HPN 1992 4044 350564	OK
10. SELECT rank_dom_aircraft_miles, rank_dom_avail_seat_miles, rank_dom_enplaned_pass FROM AIRPORT_RANK WHERE dot_place_cd='HPN' AND rank_data_yr=1992	(1 row) 2533494 246106000 385834	OK

RDBMS002, QRS Database Validity		
Test Procedure	**Expected Results**	**Actual Results**
11. SELECT rank_dom_onboard_pass, rank_dom_rev_pass_miles, rank_dom_sched_depart FROM AIRPORT_RANK WHERE dot_place_cd='HPN' AND rank_data_yr=1992	(1 row) 258617 135232000 6906	OK
12. SELECT rank_port_rank_num FROM AIRPORT_RANK WHERE dot_place_cd='HPN' AND rank_data_yr=1992	(1 row) 113	OK
13. SELECT port_total_port_cd, port_total_data_yr, port_total_arrive_cnt, port_total_depart_cnt FROM ASQP_AIRPORT_TOTAL WHERE port_total_port_cd='HPN' AND port_total_data_yr=1993	(1 row) HPN 1993 5201 5294	OK
14. SELECT port_total_delay_arrive_sum, port_total_delay_depart_sum FROM ASQP_AIRPORT_TOTAL WHERE port_total_port_cd='HPN' AND port_total_data_yr=1993	(1 row) 12860 22242	OK
15. SELECT flt_oag_num, airline_dot_cd, asqp_orig_port_cd, asqp_dest_port_cd, asqp_depart_dt FROM ASQP_FLIGHT_SCHEDULE WHERE flt_oag_num='0630' AND air-line_dot_cd='UA' AND asqp_orig_port_cd='PHX' AND asqp_dest_port_cd='ORD' AND asqp_depart_dt='Feb 2 1995'	(1 row) 0630 UA PHX ORD Feb 2 1995	OK
16. SELECT asqp_act_arrive_tm, asqp_act_depart_tm, asqp_act_elapse_min, asqp_crs_sched_arrive_tm FROM ASQP_FLIGHT_SCHEDULE WHERE flt_oag_num='0630' AND air-line_dot_cd='UA' AND asqp_orig_port_cd='PHX' AND asqp_dest_port_cd='ORD' AND asqp_depart_dt='Feb 2 1995'	(1 row) Jan 1 1900 12:31 PM Jan 1 1900 8:25 AM 186 Jan 1 1900 12:40 PM	OK
17. SELECT asqp_crs_sched_depart_tm, asqp_crs_sched_elapse_min, asqp_delay_arrive_min FROM ASQP_FLIGHT_SCHEDULE WHERE flt_oag_num='0630' AND air-line_dot_cd='UA' AND asqp_orig_port_cd='PHX' AND asqp_dest_port_cd='ORD' AND asqp_depart_dt='Feb 2 1995'	(1 row) Jan 1 1900 8:25 AM 195 -9	OK
18. SELECT asqp_delay_depart_min, asqp_delay_flight_min, asqp_oag_sched_arrive_tm FROM ASQP_FLIGHT_SCHEDULE WHERE flt_oag_num='0630' AND air-line_dot_cd='UA' AND asqp_orig_port_cd='PHX' AND	(1 row) 0 -9 Jan 1 1900 12:40 PM	OK

RDBMS002, QRS Database Validity		
Test Procedure	**Expected Results**	**Actual Results**
asqp_dest_port_cd='ORD' AND asqp_depart_dt='Feb 2 1995'		
19. SELECT asqp_oag_sched_depart_tm FROM ASQP_FLIGHT_SCHEDULE WHERE flt_oag_num='0630' AND airline_dot_cd='UA' AND asqp_orig_port_cd='PHX' AND asqp_dest_port_cd='ORD' AND asqp_depart_dt='Feb 2 1995'	(1 row) Jan 1 1900 8:25 AM	OK
20. SELECT seg_total_orig_port_cd, seg_total_dest_port_cd, seg_total_data_yr, seg_total_flight_cnt FROM ASQP_FLIGHT_SEGMENT_TOTAL WHERE seg_total_orig_port_cd='ORD' AND seg_total_dest_port_cd='BOS' AND seg_total_data_yr=1993	(1 row) ORD BOS 1993 5925	OK
21. SELECT seg_total_delay_flight_sum, seg_total_act_elapse_sum FROM ASQP_FLIGHT_SEGMENT_TOTAL WHERE seg_total_orig_port_cd='ORD' AND seg_total_dest_port_cd='BOS' AND seg_total_data_yr=1993	(1 row) 18928 820512	OK
22. SELECT airline_dot_cd, bal_data_yr, bal_curr_assets, bal_curr_liabilities, bal_def_credits FROM BALANCE_SHEET WHERE airline_dot_cd='UA' AND bal_data_yr='1993'	(1 row) UA 1993 3,263,755,250.00 -5,178,125,000.00 -1,424,089,750.00	OK
23. SELECT bal_net_stock_equity, bal_non_curr_liabilities, bal_oper_prop_equip, bal_total_assets FROM BALANCE_SHEET WHERE airline_dot_cd='UA' AND bal_data_yr='1993'	(1 row) 665,526,000.00 -5,031,092,750.00 7,255,355,750.00 12,298,833,500.00	OK
24. SELECT sys_month_num, cal_day, cal_id_num, day_oag_cd FROM CALENDAR WHERE cal_id_num=1 AND day_oag_cd=1 AND sys_month_num=5	(1 row) 5 1 1 2	OK
25. SELECT cal_id_num, new_yrs_day_cd, cal_id_leap_yr FROM CALENDAR_ID	Fourteen rows: 1 1 0 2 2 0 3 3 0 4 4 0 5 5 0 6 6 0 7 7 0 8 1 1 9 2 1 10 3 1 11 4 1 12 5 1 13 6 1 14 7 1	OK
26. SELECT sys_city_num, city_nm,	(1 row)	OK

RDBMS002, QRS Database Validity		
Test Procedure	**Expected Results**	**Actual Results**
city_state_cd, city_country_cd, dot_place_cd, oag_place_cd FROM CITY WHERE sys_city_num=4628	4628 Atlantic City 21 1000 AY AIY	
27. SELECT listed_airline_oag_cd, flt_oag_num_range_start, oper_airline_oag_cd, flt_oag_num_range_end FROM CODE_SHARING_AIRLINE WHERE listed_airline_oag_cd='UA' AND flt_oag_num_range_start='3400'	(1 row) UA 3400 3M 3476	OK
28. SELECT day_oag_cd, day_nm FROM DAYS	Seven rows: 1 Monday 2 Tuesday 3 Wednesday 4 Thursday 5 Friday 6 Saturday 7 Sunday	OK
29. SELECT dot_model_cd, sys_manufact_num, dot_model_nm, dot_model_series_nm, dot_model_mtow FROM DOT_AIRCRAFT_MODEL WHERE dot_model_cd='645'	(1 row) 645 44 DC-9 40 114000	OK
30. SELECT dot_model_num_eng_type, dot_model_short_nm, sys_model_type_num FROM DOT_AIRCRAFT_MODEL WHERE dot_model_cd='645'	(1 row) 2 DC-9-40 3	OK
31. SELECT airline_dot_cd, air- line_group_num, airline_type FROM DOT_AIRLINE WHERE airline_dot_cd='UA'	(1 row) UA 3 S	OK
32. SELECT airline_dot_cd, de- part_port_dot_cd, arrive_port_dot_cd, dot_model_cd, seg_data_yr FROM DOT_FLIGHT_SEGMENT_DATA WHERE airline_dot_cd='UA' AND de- part_port_dot_cd='ORD' AND ar- rive_port_dot_cd='LAX' AND seg_data_yr=1993 AND seg_data_month=2 AND dot_model_cd='732'	(1 row) UA ORD LAX 732 1993	OK
33. SELECT seg_data_month, seg_data_revenue_cap, seg_data_avail_seats, seg_data_block_min FROM DOT_FLIGHT_SEGMENT_DATA WHERE airline_dot_cd='UA' AND de- part_port_dot_cd='ORD' AND ar- rive_port_dot_cd='LAX' AND seg_data_yr=1993 AND seg_data_month=2 AND dot_model_cd='732'	(1 row) 2 1854260 6854 5936	OK

RDBMS002, QRS Database Validity		
Test Procedure	**Expected Results**	**Actual Results**
34. SELECT seg_data_num_trips, seg_data_onboard_pass, seg_data_stage_len FROM DOT_FLIGHT_SEGMENT_DATA WHERE airline_dot_cd='UA' AND de- part_port_dot_cd='ORD' AND ar- rive_port_dot_cd='LAX' AND seg_data_yr=1993 AND seg_data_month=2 AND dot_model_cd='732'	(1 row) 23 5023 1744	OK
35. SELECT dot_place_cd, dot_place_lat_degr, dot_place_lat_min, dot_place_lat_sec, dot_place_lat_hemi FROM DOT_PLACE WHERE dot_place_cd='HPN'	(1 row) HPN 41 4 8 N	OK
36. SELECT dot_place_long_degr, dot_place_long_min, dot_place_long_sec, dot_place_long_hemi FROM DOT_PLACE WHERE dot_place_cd='HPN'	(1 row) 73 42 28 W	OK
37. SELECT dot_place_nm, world_area_cd FROM DOT_PLACE WHERE dot_place_cd='HPN'	(1 row) White Plains, New York, US 22	OK
38. SELECT airline_dot_cd, entity_dot_cd, empct_data_yr, empct_ac_ctrl, empct_ac_traffic, empct_craft_hndl FROM EMPLOYEE_COUNT WHERE airline_dot_cd='UA' AND en- tity_dot_cd='A' AND empct_data_yr=1994	(1 row) UA A 1994 15 209 0	OK
39. SELECT empct_flt_attendants, empct_flt_oper_other, empct_flt_pers_pilots, empct_gen_mgmt FROM EMPLOYEE_COUNT WHERE airline_dot_cd='UA' AND en- tity_dot_cd='A' AND empct_data_yr=1994	(1 row) 1582 83 543 4	OK
40. SELECT empct_hndl_cargo, empct_hndl_pass, empct_labor_maint, empct_pers_other, empct_pers_stat FROM EMPLOYEE_COUNT WHERE airline_dot_cd='UA' AND en- tity_dot_cd='A' AND empct_data_yr=1994	(1 row) 460 607 423 1739 281	OK
41. SELECT empct_pers_traffic, empct_pers_train, empct_pers_transport FROM EMPLOYEE_COUNT WHERE airline_dot_cd='UA' AND en- tity_dot_cd='A' AND empct_data_yr=1994	(1 row) 85 33 0	OK
42. SELECT sys_engine_num, sys_manufact_num, engine_model_nm FROM ENGINE WHERE sys_engine_num=40	(1 row) 40 52 TRENT	OK
43. SELECT airline_dot_cd, entity_dot_cd, dot_model_cd, grp1_data_yr, grp1_craft_fuel_oil FROM GROUP_1_ OPERATING_COSTS WHERE airline_dot_cd='JH' AND	(1 row) JH D 710 1989	OK

RDBMS002, QRS Database Validity		
Test Procedure	**Expected Results**	**Actual Results**
dot_model_cd='710' AND grp1_data_yr=1989 AND entity_dot_cd='D'	3,755,129.00 0.0	
44. SELECT grp1_equip_depr_rent, grp1_equip_maint, grp1_other_oper_not_rent, grp1_wages_benefits FROM GROUP_1_ OPERATING_COSTS WHERE airline_dot_cd='JH' AND dot_model_cd='710' AND grp1_data_yr=1989 AND entity_dot_cd='D'	(1 row) 4,592,228.00 3,984,485.00 510,949.00 1,649,116.00	OK
45. SELECT airline_dot_cd, entity_dot_cd, dot_model_cd, grp2_data_yr, grp2_amort_equip FROM GROUP_23_OPERATING_COSTS WHERE airline_dot_cd='UA' AND dot_model_cd='822' AND grp2_data_yr=1994 AND entity_dot_cd='D'	(1 row) UA D 822 1994 0.00	OK
46. SELECT grp2_appl_maint_burd, grp2_craft_chrgs, grp2_craft_fuel, grp2_craft_maint_inter FROM GROUP_23_OPERATING_COSTS WHERE airline_dot_cd='UA' AND dot_model_cd='822' AND grp2_data_yr=1994 AND entity_dot_cd='D'	(1 row) 1,644,000.00 0.00 2,930,000.00 0.00	OK
47. SELECT grp2_craft_oil, grp2_craft_rent, grp2_depr_eng, grp2_depr_eng_parts, grp2_depr_frame FROM GROUP_23_OPERATING_COSTS WHERE airline_dot_cd='UA' AND dot_model_cd='822' AND grp2_data_yr=1994 AND entity_dot_cd='D'	(1 row) 15,000 10,000.00 16,000 191,000.00 57,000.00	OK
48. SELECT grp2_depr_frame_parts, grp2_depr_other, grp2_empl_benefits, grp2_eng_maint_labor FROM GROUP_23_OPERATING_COSTS WHERE airline_dot_cd='UA' AND dot_model_cd='822' AND grp2_data_yr=1994 AND entity_dot_cd='D'	(1 row) 40,000.00 202,000.00 455,000.00 391,000.00	OK
49. SELECT grp2_eng_maint_materials, grp2_eng_maint_outside, grp2_eng_overhaul_def FROM GROUP_23_OPERATING_COSTS WHERE airline_dot_cd='UA' AND dot_model_cd='822' AND grp2_data_yr=1994 AND entity_dot_cd='D'	(1 row) 727,000.00 194,000.00 0.00	OK

RDBMS002, QRS Database Validity		
Test Procedure	**Expected Results**	**Actual Results**
50. SELECT grp2_eng_worthy_prov, grp2_flt_pers_wages, grp2_frame_maint_labor FROM GROUP_23_OPERATING_COSTS WHERE airline_dot_cd='UA' AND dot_model_cd='822' AND grp2_data_yr=1994 AND entity_dot_cd='D'	(1 row) 0.00 499,00.00 705,000.00	OK
51. SELECT grp2_frame_maint_materials, grp2_frame_maint_outside, grp2_frame_overhaul_def FROM GROUP_23_OPERATING_COSTS WHERE airline_dot_cd='UA' AND dot_model_cd='822' AND grp2_data_yr=1994 AND entity_dot_cd='D'	(1 row) 260,000.00 113,000.00 0.00	OK
52. SELECT grp2_frame_worthy_prov, grp2_instr_wages, grp2_insurance_purch, grp2_loss_damage FROM GROUP_23_OPERATING_COSTS WHERE airline_dot_cd='UA' AND dot_model_cd='822' AND grp2_data_yr=1994 AND entity_dot_cd='D'	(1 row) 0.00 52,000.00 62,000.00 0.00	OK
53. SELECT grp2_other_fly_exp, grp2_other_supp, grp2_other_taxes, grp2_payroll_taxes, grp2_pers_exp FROM GROUP_23_OPERATING_COSTS WHERE airline_dot_cd='UA' AND dot_model_cd='822' AND grp2_data_yr=1994 AND entity_dot_cd='D'	(1 row) 0.00 0.00 275,000.00 75,000.00 97,000.00	OK
54. SELECT grp2_pilot_wages, grp2_prof_exp, grp2_expd_parts_obs_det FROM GROUP_23_OPERATING_COSTS WHERE airline_dot_cd='UA' AND dot_model_cd='822' AND grp2_data_yr=1994 AND entity_dot_cd='D'	(1 row) 1,268,000.00 0.00 18,000.00	OK
55. SELECT sys_manufact_num, manufact_nm FROM MANUFACTURER WHERE sys_manufact_num=25	(1 row) 25 De Havilland	OK
56. SELECT sys_month_num, month_nm, month_qtr, month_day_count FROM MONTHS	Twelve rows: 1 January 1 31 2 February 1 28 3 March 1 31 4 April 2 30 5 May 2 31 6 June 2 30	OK

RDBMS002, QRS Database Validity		
Test Procedure	**Expected Results**	**Actual Results**
	7 July 3 31 8 August 3 31 9 September 3 30 10 October 4 31 11 November 4 30 12 December 4 31	
57. SELECT oag_model_cd, sys_manufact_num, oag_model_nm, oag_model_series_nm, oag_model_gtow FROM OAG_AIRCRAFT_MODEL WHERE oag_model_cd=141	(1 row) 141 14 BAe146 100 84000	OK
58. SELECT oag_model_num_eng_type, oag_model_seat_low_cnt, oag_model_seat_high_cnt FROM OAG_AIRCRAFT_MODEL WHERE oag_model_cd=141	(1 row) 4 93 3	OK
59. SELECT sys_model_type_num FROM OAG_AIRCRAFT_MODEL WHERE oag_model_cd=141	(1 row) 63	OK
60. SELECT airline_oag_cd, airline_code_share FROM OAG_AIRLINE WHERE airline_oag_cd='UA'	(1 row) UA 1	OK
61. SELECT fare_class_oag_cd, fare_class_nm FROM OAG_FARE_CLASS WHERE fare_class_oag_cd='P'	(1 row) P First Class Premium	OK
62. SELECT sys_flt_num, depart_port_oag_cd, arrive_port_oag_cd, airline_oag_cd, oag_model_cd FROM OAG_FLIGHT WHERE flt_oag_num=233430	(1 row) 233430 CMN GVA AT 72S	OK
63. SELECT flt_oag_num, flt_eff_range_start_dt, flt_eff_range_end_dt, flt_sched_depart_tm FROM OAG_FLIGHT WHERE flt_oag_num=233430	(1 row) 932 Jan 1 1900 12:00 AM Jan 1 2050 12:00 AM	OK
64. SELECT flt_sched_arrive_tm, flt_sched_elapse_min, flt_type FROM OAG_FLIGHT WHERE flt_oag_num=233430	(1 row) Jan 1 1900 9:30 AM Jan 1 1900 2:10 AM 160 P	OK
65. SELECT sys_flt_num, depart_day_oag_cd FROM OAG_FLIGHT_DEPARTURE WHERE sys_flt_num=233440	(1 row) 233440 4	OK
66. SELECT sys_flt_num, exception_dt, exception_type FROM OAG_FLIGHT_EXCEPTIONS WHERE sys_flt_num=322	(1 row) 322 Jan 8 1993 12:00 AM OP	OK
67. SELECT sys_flt_num, fare_class_oag_cd FROM OAG_FLIGHT_FARE_CLASS WHERE sys_flt_num=233440 AND exception_type='F'	(1 row) 233440 F	OK
68. SELECT oag_seg_data_yr,	(1 row)	OK

RDBMS002, QRS Database Validity			
	Test Procedure	**Expected Results**	**Actual Results**
	oag_model_cd, airline_oag_cd, oag_seg_depart_port_cd FROM OAG_FLIGHT_ SEGMENT_DATA WHERE oag_seg_data_yr=1993 AND oag_model_cd='100' AND air- line_oag_cd='6A' AND oag_seg_depart_port_cd='MTY' AND oag_seg_arrive_port_cd='MID'	1993 100 6A MTY	
69.	SELECT oag_seg_arrive_port_cd, oag_seg_depart_cnt, oag_seg_load_factor, oag_seg_stage_len FROM OAG_FLIGHT_ SEGMENT_DATA WHERE oag_seg_data_yr=1993 AND oag_model_cd='100' AND air- line_oag_cd='6A' AND oag_seg_depart_port_cd='MTY' AND oag_seg_arrive_port_cd='MID'	(1 row) MID 226 0.598000 743	OK
70.	SELECT oag_seg_total_block_min FROM OAG_FLIGHT_ SEGMENT_DATA WHERE oag_seg_data_yr=1993 AND oag_model_cd='100' AND air- line_oag_cd='6A' AND oag_seg_depart_port_cd='MTY' AND oag_seg_arrive_port_cd='MID'	(1 row) 25535	OK
71.	SELECT oag_ns_data_year, oag_model_cd, oag_ns_seg_depart_port_cd, oag_ns_seg_arrive_port_cd FROM OAG_NOSHARE_ FLIGHT_SEG_DATA WHERE oag_ns_data_year=1993 AND oag_model_cd='100' AND oag_ns_seg_depart_port_cd='ACC' AND oag_ns_seg_arrive_port_cd='LOS'	(1 row) 1993 100 ACC LOS	OK
72.	SELECT oag_ns_seg_depart_cnt, oag_ns_seg_load_factor, oag_ns_seg_stage_len FROM OAG_NOSHARE_ FLIGHT_SEG_DATA WHERE oag_ns_data_year=1993 AND oag_model_cd='100' AND oag_ns_seg_depart_port_cd='ACC' AND oag_ns_seg_arrive_port_cd='LOS'	(1 row) 9 .59800 250	OK
73.	SELECT oag_ns_seg_total_block_min FROM OAG_NOSHARE_ FLIGHT_SEG_DATA WHERE oag_ns_data_year=1993 AND oag_model_cd='100' AND oag_ns_seg_depart_port_cd='ACC' AND oag_ns_seg_arrive_port_cd='LOS'	(1 row) 540	OK
74.	SELECT oag_place_cd, oag_place_nm FROM OAG_PLACE WHERE oag_place_cd='LOS'	(1 row) LOS Lagos, Nigeria M. Muhamm	OK
75.	SELECT oag_place_lat_degr, oag_place_lat_min, oag_place_lat_sec, oag_place_lat_hemi, FROM OAG_PLACE	(1 row) 6 27 0	OK

RDBMS002, QRS Database Validity		
Test Procedure	**Expected Results**	**Actual Results**
WHERE oag_place_cd='LOS'	N	
76. SELECT oag_place_long_degr, oag_place_ long _min, oag_place_ long _sec, oag_place_ long _hemi, FROM OAG_PLACE WHERE oag_place_cd='LOS'	(1 row) 3 24 0 E	OK
77. SELECT oad_total_port_cd, oad_total_data_yr, oad_dom_pass_cnt_arrive_sum FROM OD_AIRPORT_TOTAL WHERE oad_total_port_cd='LAX' AND oad_total_data_yr=1993	(1 row) LAX 1993 12215890	OK
78. SELECT oad_dom_pass_rev_arrive_sum, oad_init_trip_cnt_arrive_sum, oad_intl_pass_cnt_arrive_sum FROM OD_AIRPORT_TOTAL WHERE oad_total_port_cd='LAX' AND oad_total_data_yr=1993	(1 row) 1,883,007,541.00 11268950 1832200	OK
79. SELECT oad_dom_pass_cnt_depart_sum, oad_dom_pass_rev_depart_sum FROM OD_AIRPORT_TOTAL WHERE oad_total_port_cd='LAX' AND oad_total_data_yr=1993	(1 row) 12359210 1,920,256,997.00	OK
80. SELECT oad_init_trip_cnt_depart_sum, oad_intl_pass_cnt_depart_sum FROM OD_AIRPORT_TOTAL WHERE oad_total_port_cd='LAX' AND oad_total_data_yr=1993	(1 row) 13028140 1866400	OK
81. SELECT oad_seg_orig_port_cd, oad_seg_dest_port_cd, oad_seg_data_yr, oad_seg_avg_coupons_sum FROM OD_FLIGHT_SEGMENT_TOTAL WHERE oad_seg_orig_port_cd='LAX' AND oad_seg_dest_port_cd='ORD' AND oad_seg_data_yr=1993	(1 row) LAX ORD 1993 1.216603	OK
82. SELECT oad_seg_avg_itin_miles_sum, oad_seg_dom_pass_cnt_sum, oad_seg_dom_pass_rev_sum FROM OD_FLIGHT_ SEGMENT_TOTAL WHERE oad_seg_orig_port_cd='LAX' AND oad_seg_dest_port_cd='ORD' AND oad_seg_data_yr=1993	(1 row) 1790.094306 460630 106,154,007.00	OK
83. SELECT oad_seg_dom_zero_fare_cnt_sum, oad_seg_intl_pass_cnt_sum FROM OD_FLIGHT_SEGMENT_TOTAL WHERE oad_seg_orig_port_cd='LAX' AND oad_seg_dest_port_cd='ORD' AND oad_seg_data_yr=1993	(1 row) 60740 123090	OK
84. SELECT sys_oper_num, world_area_cd, sys_oper_type_num, oper_nm FROM OPERATOR WHERE sys_oper_num=211	(1 row) 211 324 1 National Airlines	OK
85. SELECT sys_oper_type_num, oper_type_nm	Four rows: 1 Airlines	OK

RDBMS002, QRS Database Validity		
Test Procedure	**Expected Results**	**Actual Results**
FROM OPERATOR_TYPE	2 Private Operators 3 Government Agencies 4 Manufacturers, Brokers, and Leasing Companies	
86. SELECT oad_orig_port_cd, oad_dest_port_cd, oad_data_year, oad_data_qtr, oad_avg_coupons FROM ORIGIN_AND_DESTINATION WHERE oad_orig_port_cd='LAX' AND oad_dest_port_cd='ORD' AND oad_data_year=1994 AND oad_data_qtr=1	(1 row) LAX ORD 1993 1 1.190000	OK
87. SELECT oad_avg_itin_miles, oad_dom_pass_cnt, oad_dom_pass_rev, oad_dom_zero_fare_cnt FROM ORIGIN_AND_DESTINATION WHERE oad_orig_port_cd='LAX' AND oad_dest_port_cd='ORD' AND oad_data_year=1994 AND oad_data_qtr=1	(1 row) 1781.780622 100010 24,312,431.00 11700	OK
88. SELECT oad_init_trip_cnt, oad_intl_pass_cnt FROM ORIGIN_AND_DESTINATION WHERE oad_orig_port_cd='LAX' AND oad_dest_port_cd='ORD' AND oad_data_year=1994 AND oad_data_qtr=1	(1 row) 78800 248800	OK
89. SELECT airline_dot_cd, entity_dot_cd, pl_data_yr, pl_exp_depr_amort, pl_exp_ga, pl_exp_maint FROM PROFIT_AND_LOSS WHERE airline_dot_cd='UA' AND pl_data_yr=1993 AND entity_dot_cd='D'	(1 row) UA D 1993 513,367,000.00 354,319,000.00 1,118,768,000.00	OK
90. SELECT pl_exp_oper, pl_exp_pass_serv, pl_exp_promot_sales, pl_exp_traffic_serv, pl_exp_transport FROM PROFIT_AND_LOSS WHERE airline_dot_cd='UA' AND pl_data_yr=1993 AND entity_dot_cd='D'	(1 row) 2,558,265,000.00 875,475,000.00 1,467,378,000.00 1,439,136,000.00 282,861,000.00	OK
91. SELECT pl_rev_charter, pl_rev_freight, pl_rev_other, pl_rev_pass, pl_exp_income_tax FROM PROFIT_AND_LOSS WHERE airline_dot_cd='UA' AND pl_data_yr=1993 AND entity_dot_cd='D'	(1 row) 19,373,000.00 338,225,000.00 576,723,000.00 7,859,443,000.00 -41,991,000.00	OK
92. SELECT pl_exp_interest_ltd, pl_exp_interest_other, pl_exp_nonoper, pl_extra_items FROM PROFIT_AND_LOSS WHERE airline_dot_cd='UA' AND pl_data_yr=1993 AND entity_dot_cd='D'	(1 row) 198,315,000.00 -17,399,000.00 15,715,000.00 18,569,000.00	OK
93. SELECT taf_place_cd, taf_avg_vfr_days, taf_base_yr, taf_forecast_start_yr, taf_ils_runway_cnt FROM TAF_DATA WHERE taf_place_cd='ORD'	(1 row) ORD 321.000000 1976 1995	OK

RDBMS002, QRS Database Validity		
Test Procedure	**Expected Results**	**Actual Results**
	11	
94. SELECT taf_pract_ann_cap, taf_runway_cnt FROM TAF_DATA WHERE taf_place_cd='ORD'	(1 row) 841000.000000 14	OK
95. SELECT taf_place_cd, taf_oper_yr, taf_oper_carr_itin, taf_oper_carr_enplane, taf_oper_comm_enplane FROM TAF_OPERATIONS WHERE taf_place_cd='ORD' AND taf_oper_yr=1995	(1 row) ORD 1995 746431 28707481 1432054	OK
96. SELECT taf_oper_gen_avi_itin, taf_oper_gen_avi_local, taf_oper_intl_enplane, taf_oper_mil_itin FROM TAF_OPERATIONS WHERE taf_place_cd='ORD' AND taf_oper_yr=1995	(1 row) 35993 0 1029391 3041	OK
97. SELECT taf_oper_mil_local, taf_oper_supp_enplane, taf_oper_taxi_enplane, taf_oper_taxi_itin FROM TAF_OPERATIONS WHERE taf_place_cd='ORD' AND taf_oper_yr=1995	(1 row) 0 439 104967	OK
98. SELECT taf_place_cd, taf_place_nm, taf_city_nm, us_state_cd, taf_us_region_cd FROM TAF_PLACE WHERE taf_place_cd='ORD'	(1 row) ORD Chicago-O'Hare International Chicago IL AGL	OK
99. SELECT taf_us_region_cd, taf_us_region_nm FROM TAF_US_REGION	Nine rows: AAL Alaskan Region ACE Central Region AEA Eastern Region AGL Great Lakes Region ANE New England Region ANM Northwest Mountain Region ASO Southern Region ASW Southwest Region AWP Western-Pacific Region	OK
100. SELECT airline_dot_cd, entity_dot_cd, dot_model_cd, traf_data_yr, traf_airborne_hours, traf_block_hours FROM TRAFFIC WHERE airline_dot_cd='UA' AND dot_model_cd='730' AND traf_data_yr=1990 AND entity_dot_cd='D'	(1 row) UA D 730 1990 150888 172086	OK
101. SELECT traf_craft_days, traf_fuel_gal, traf_sched_asm, traf_sched_ns_ac_rev_dep, traf_sched_ns_ac_rev_mi FROM TRAFFIC WHERE airline_dot_cd='UA' AND dot_model_cd='730' AND traf_data_yr=1990 AND entity_dot_cd='D'	(1 row) 17037 374870386 2088573000 50310 72954814	OK
102. SELECT traf_sched_ns_asm, traf_sched_ns_freight_rtm,	(1 row) 20905468000	OK

RDBMS002, QRS Database Validity		
Test Procedure	**Expected Results**	**Actual Results**
traf_sched_ns_mail_rtm, traf_sched_ns_rpm FROM TRAFFIC WHERE airline_dot_cd='UA' AND dot_model_cd='730' AND traf_data_yr=1990 AND entity_dot_cd='D'	390437000 103068000 14352068000	
103. SELECT traf_sched_ns_total_atm, traf_sched_pass_enplane, traf_sched_rpm, traf_sched_total_atm FROM TRAFFIC WHERE airline_dot_cd='UA' AND dot_model_cd='730' AND traf_data_yr=1990 AND entity_dot_cd='D'	(1 row) 3240653000 0 14340855000 1927609000	OK
104. SELECT traf_sched_total_rtm FROM TRAFFIC WHERE airline_dot_cd='UA' AND dot_model_cd='730' AND traf_data_yr=1990 AND entity_dot_cd='D'	(1 row) 1927609	OK
105. SELECT us_state_cd, us_state_nm FROM US_STATE	Fifty-seven rows: Standard two-digit state and US territory abbreviations	OK
106. SELECT world_area_cd, world_area_nm, world_area_grp_cd FROM WORLD_AREA WHERE world_area_cd=1000	(1 row) 1000 United States 10	OK
107. SELECT world_area_grp_cd, world_area_grp_nm FROM WORLD_AREA_GROUP	Eleven rows: 0 Unknown World Area Group 1 Middle America 2 Caribbean, Bahamas, Bermuda 3 South America 4 Europe 5 Africa 6 Middle East 7 Far East 8 Australasia and Oceania 9 Canada and Greenland 10 United States	OK
108. SELECT port_ns_data_yr, sys_month_num, day_oag_cd FROM OAG_NOSHARE_AIRPORT_DATA WHERE port_ns_data_yr=1993 AND sys_month_num=1 AND day_oag_cd=1 AND port_ns_data_hour_num=6 AND oag_model_cd='DH8' AND oag_place_cd='ORG'	(1 row) 1993 1 1	OK
109. SELECT port_ns_data_hour_num, port_ns_data_min_num, oag_place_cd FROM OAG_NOSHARE_AIRPORT_DATA WHERE port_ns_data_yr=1993 AND sys_month_num=1 AND day_oag_cd=1 AND port_ns_data_hour_num=6 AND oag_model_cd='DH8' AND oag_place_cd='ORG'	(1 row) 6 45 ORD	OK
110. SELECT oag_model_cd,	(1 row)	OK

RDBMS002, QRS Database Validity		
Test Procedure	**Expected Results**	**Actual Results**
port_ns_data_depart_cnt, port_ns_data_arrive_cnt FROM OAG_NOSHARE_AIRPORT_DATA WHERE port_ns_data_yr=1993 AND sys_month_num=1 AND day_oag_cd=1 AND port_ns_data_hour_num=6 AND oag_model_cd='DH8' AND oag_place_cd='ORG'	DH8 0 4	
111. SELECT port_ data_yr, sys_month_num, day_oag_cd FROM OAG_NOSHARE_AIRPORT_DATA WHERE port_ns_data_yr=1993 AND sys_month_num=1 AND day_oag_cd=1 AND port_data_hour_num=6 AND oag_model_cd='DH8' AND oag_place_cd='ORG'	(1 row) 1993 1 1	OK
112. SELECT port_ data_hour_num, port_data_min_num, oag_place_cd FROM OAG_NOSHARE_AIRPORT_DATA WHERE port_ns_data_yr=1993 AND sys_month_num=1 AND day_oag_cd=1 AND port_data_hour_num=6 AND oag_model_cd='DH8' AND oag_place_cd='ORG'	(1 row) 6 45 ORD	OK
113. SELECT oag_model_cd, airline_oag_cd, port_data_depart_cnt, port_data_arrive_cnt FROM OAG_NOSHARE_AIRPORT_DATA WHERE port_ns_data_yr=1993 AND sys_month_num=1 AND day_oag_cd=1 AND port_data_hour_num=6 AND oag_model_cd='DH8' AND oag_place_cd='ORG'	(1 row) DH8 UA 0 4	OK
114. SELECT dot_place_cd, wx_date, wx_hour, wx_barom_pressure, wx_ceiling_height FROM TAP_WEATHER WHERE dot_place_cd=**XXX** and wx_date=**XXX** AND wx_hour=**XXX**	EMPTY	OK
115. SELECT wx_horiz_visibility, wx_hourly_precip, wx_meteor_cond, wx_obs_indicator FROM TAP_WEATHER WHERE dot_place_cd=**XXX** and wx_date=**XXX** AND wx_hour=**XXX**	EMPTY	OK
116. SELECT wx_snow_depth, wx_temperature, wx_weather_idx, wx_wind_direction, wx_wind_speed FROM TAP_WEATHER WHERE dot_place_cd=**XXX** and wx_date=**XXX** AND wx_hour=**XXX**	EMPTY	OK
117. SELECT new_world_area_cd, old_world_area_cd FROM RETIRED_WORLD_AREA	(1row) 950 977	OK

RDBMS002, QRS Database Validity		
Test Procedure	**Expected Results**	**Actual Results**
WHERE new_world_area_cd=950		
118. SELECT b43_data_yr, b43_owner_type, b43_serial_num_id, dot_model_cd FROM B43_INVENTORY WHERE b43_serial_num_id='11228'	(1 row) 1994 OL 11228 602	OK
119. SELECT airline_dot_cd, b43_first_del_yr, b43_noise_cat_num, b43_seat_cnt, b43_tail_num_id FROM B43_INVENTORY WHERE b43_serial_num_id='11228'	(1row) US 1985 2 68 N479AU	OK
120. SELECT year_num, cal_id_num FROM YEAR WHERE year_num=1995	(1 row) 1995 7	OK

Other Observations

All data seems to be in the right form and correct based on this sampling.

Date: 11/27/96 Initials: PR

RDBMS010, QRS Report Specification Database Analysis		
Test Procedure	**Expected Results**	**Actual Results**
1. Perform desktop analysis of the QRS Report Specification Database model using the entity-relationship diagram generated by ERWin software.	See printout of database map	OK
2. Ensure abbreviations are used sparingly and are meaningful to the end-user.	Abbreviations are used sparingly and are meaningful to the end-user.	OK
3. Ensure extraneous objects are not present.	Extraneous objects are not present.	OK
4. Ensure data values do not differentiate or define entities or other attributes.	Data values do not differentiate or define entities or other attributes.	OK
5. Ensure data values are not modeled.	Data values are not modeled.	OK
6. Ensure attributes exist in the database once, except for foreign keys.	Attributes exist in the database once, except for foreign keys.	OK
7. Ensure no embedded attributes exist.	No embedded attributes exist.	OK
8. Ensure no entities are without attributes. Ensure no entities have only one attribute.	No entities are without attributes. No entities have only one attribute.	OK
9. Ensure data object names are meaningful and follow a uniform approach.	Data object names are meaningful and follow a uniform approach.	OK
Other Observations		

Date: 12/16/96 Initials: PR

RDBMS011, QRS Report Specification Database Validity		
Test Procedure	**Expected Results**	**Actual Results**
1. Using ISQL, perform the following queries:		
2. SELECT sys_category_id, category_nm FROM CATEGORY	1 Miscellaneous (includes Air…. 2 Airport Data 3 Carrier Data 4 Equipment Data 5 Flight Segment Data 6 Origin & Destination Data 7 Jet Engine Data	OK
3. SELECT sys_report_id, sys_col_id, format_cd, justify_cd, col_formula, col-order, col_query_part, col_width FROM COLUMN WHERE sys_report_id=10	10 1 T0 L NULL 1 2 13 10 2 T0 L NULL 2 3 13 10 3 T0 L NULL 3 1 35	OK
4. SELECT sys_report_id, sys_col_id, total_order, format_cd, justify_cd, col_total_formula FROM COLUMN TOTAL WHERE sys_report_id=8	8 6 1 C0 R @SUM	OK
5. SELECT format_cd, format_text FROM FORMAT WHERE fomat_cd='C0'	C0 F;P3;FI0	OK
6. SELECT sys_report_id, sys_col_id, head_order, justify_cd, head_text FROM HEADING where sys_report_id=10	10 1 1 C OAG 10 1 2 C Carrier Code 10 2 1 C DOT 10 2 2 C Carrier Code 10 3 1 C Carrier 10 3 2 C Name	OK
7. SELECT justify_cd, justify_text FROM JUSTIFY	C C L L R R	OK
8. SELECT sys_report_id, sys_category_id, report_desc, report_filename, report_query, report_title FROM REPORT WHERE sys_report_id=10	10 1 NULL ARLNCOD1 SELECT OPERATOR.oper_nm, AIRLINE_OPERATOR…….. …….Carrier Codes and Names (sorted by carrier code) NULL	OK
9. SELECT sys_report_id, total_order, total_text, total_position FROM TOTAL WHERE sys_port_id=50	50 1 Total TOP	OK
10. Check to make sure all reports are accounted for in each table: a. SELECT count(distinct sys_report_id) form HEADING b. SELECT count(distinct sys_report_id) from COLUMN c. SELECT count(*) from REPORT d. SELECT count(*) from TOTAL	a, b, c, and d should all be the same number	OK

RDBMS011, QRS Report Specification Database Validity		
Test Procedure	**Expected Results**	**Actual Results**
11. For several sys_report_id's check to make sure the correct columns appear (check against report printouts in test QRS010) using this commands: (use **<number>=**7, 20, 33, 64, 108) SELECT sys_report_id, report_title from REPORT WHERE sys_report_id=**<number>** SELECT * from HEADING WHERE sys_report_id=**<number>**	All the report headings line up the same as in the QRS010 reports	OK
Other Observations		

Date: 12/17/96 Initials: PR

RDBMS020, Database Access		
Test Procedure	**Expected Results**	**Actual Results**
1. Attempt to log into ISQL as a valid user of ASACQRS. Perform a select statement.	Select statement works as expected	OK
2. Attempt to log into ISQL as "JoePaterno" password: "goLions"	Does not allow access to database	OK
3. From Netscape or another web browser perform a report that takes a while to run (i.e. any Origin and Destination with no constraints on the airports). While the report is running, execute the following isql statement: sp_who	Under the longiname column there should be a user named "webuser" (Note: if the report finishes generating before you check users on isql, webuser will not appear, this why you need use a long running report)	OK
4. Using the RCS type the following command: co od-ct1.rs Use vaild password	A read only file appears in the directory	OK
Edit the text between the .BEGIN FILENAME and the .END FILENAME from od-ct1 to test and save the file as test.rs	File saves	OK
From the command line type: rspec test.rs Use a valid password	Get message: Report Specification: 'test.rs' with filename 'test' has been successfully stored in the database	OK
Attempt the following command: rspec -d test Use the password "goPennState"	Get long error message with "Login failed" in it	OK
Attempt the following command: rspec -d test Use vaild password At promt, press 'y'	"test" is deleted from database	OK
Other Observations		

Date: 12/16/96 Initials: PR

RDBMS030, RDBMS Concurrent Users		
Test Procedure	**Expected Results**	**Actual Results**
Log into 9 terminals		OK
At each terminal, log into isql (nine total concurrent logins)	Database allows multiiple users	OK
Type: sp_who and check to make sure there are nine concurrent users	Login name appears nine times	OK
Other Observations		

Date: 12/17/96 Initials: PR

QRS001, WWW Presentation and Editorial Consistency		
Test Procedure	**Expected Results**	**Actual Results**
1.From the ASAC Home Page, select "ASAC Quick Response System (QRS)"	Goes to QRS Welcome Page	OK
2. Ensure that instructions on the QRS Welcome Page are understandable and correct, that the page is easily readable, and is editorially correct.	Instructions are clear and understandable, page is easily readable and editorially correct	OK
3. Select "Enter ASAC Quick Response System"	A list of QRS tools is clearly presented along with a list of help options	OK
4. Select "QRS Report Server"	Instructions and options for the QRS Report Server are presented	OK
5. Ensure the page is easily readable.	Page is easily readable.	OK
6. Ensure that the page is consistent in presentation with the established pages	Page is consistent with previous pages.	OK
7. Ensure that items on the page are editorially correct, easily understandable, and consistent.	Page is editorially correct, understandable, and consistent	OK
8. Select "Continue to ASAC QRS Report Categories"	All seven report categories are presented.	OK
Repeat steps 5-7	Page is easily readable. Items on the page are consistent in presentation with the established pages. Items on the page are editorially correct, easily understandable, and consistent with items on other pages.	OK
Select Airport Data .	Airport Data report list is displayed	OK
Repeat steps 5-7, select back	Page is easily readable. Items on the page are consistent in presentation with the established pages. Items on the page are editorially correct, easily understandable, and consistent with items on other pages.	OK
Select Carrier Data.	Carrier Data report list is displayed	OK
Repeat steps 5-7, select back	Page is easily readable. Items on the page are consistent in presentation with the established pages. Items on the page are editorially correct, easily understandable, and consistent with items on other pages.	OK
Select Equipment Data.	Equipment Data report list is displayed	OK
Repeat steps 5-7, select back	Page is easily readable. Items on the page are consistent in presentation with the established pages. Items on the page are editorially correct, easily understandable, and consistent with items on other pages.	OK
Select Flight Segment Data.	Flight Segment Data report list is displayed	OK
Repeat steps 5-7, select back	Page is easily readable. Items on the page are consistent in presentation with the established pages. Items on	OK

QRS001, WWW Presentation and Editorial Consistency		
Test Procedure	**Expected Results**	**Actual Results**
	the page are editorially correct, easily understandable, and consistent with items on other pages.	
Select Jet Engine Data.	Jet Engine Data report list is displayed	OK
Repeat steps 5-7, select back	Page is easily readable. Items on the page are consistent in presentation with the established pages. Items on the page are editorially correct, easily understandable, and consistent with items on other pages.	OK
Select Origin & Destination Data.	Origin & Destination Data report list is displayed	OK
Repeat steps 5-7, select back	Page is easily readable. Items on the page are consistent in presentation with the established pages. Items on the page are editorially correct, easily understandable, and consistent with items on other pages.	OK
Select Miscellaneous (includes Airport and Carrier Codes).	Miscellaneous report list is displayed	OK
Repeat steps 5-7, select back	Page is easily readable. Items on the page are consistent in presentation with the established pages. Items on the page are editorially correct, easily understandable, and consistent with items on other pages.	OK
Select List All ASAC QRS Reports (Sorted by Report Name)	All reports are listed alphabetically by report name	OK
Repeat steps 5-7, select back	Page is easily readable. Items on the page are consistent in presentation with the established pages. Items on the page are editorially correct, easily understandable, and consistent with items on other pages.	OK
Select List All ASAC QRS Reports (Sorted by Report Title)	All reports are listed alphabetically by report title.	OK
Repeat steps 5-7, select back	Page is easily readable. Items on the page are consistent in presentation with the established pages. Items on the page are editorially correct, easily understandable, and consistent with items on other pages.	OK
Note: Each Report page (e.g., all reports available under each category) will be tested for presentation and editorial consistency as part of test scenario QRS010, Report Specification Program Functionality.		
Other Observations		

Date: 12/16/96 Initials: PR

QRS002, WWW Page Operation		
Test Procedure	**Expected Results**	**Actual Results**
From any browser go to <http://www.asac.lmi.org/>	Goes to ASAC Home Page	OK
Select “ASAC Quick Response System (QRS)”	Goes to QRS Welcome Page	OK
At the bottom of the page, select “ASAC Server Usage” link	Goes to Server Usage Page	OK
At the bottom of the page, select “ASAC Questions, Comments, or Feedback”	Brings up a mailing window addressed to ASAC Webmaster	OK
Send an email to the Webmaster, ensure that he/she receives it.	Message is received by Webmaster	OK
At the bottom of the QRS Welcome Page, select “Logistics Management Institute” link	Goes to LMI Home Page	OK
Go to the QRS Home Page <http://www.asac.lmi.org/access/index.html>	Goes to QRS Home Page	OK
At the bottom of the page, select “Go to the ASAC Home Page”, then go back	Goes to ASAC Home Page and returns to QRS Home Page	OK
From the QRS Home Page select Report Server then select Continue to ASAC QRS Report Categories	A window requesting authentication should pop up	OK
Log in as an invalid user	Should deny access	OK
Log in as a valid user	Should go to the Report Categories Page	OK
Go back to QRS Home Page and select Change your ASAC QRS Password	If the new password is at least six characters, a page should appear to notify a successful change.	OK
Change password, exit Netscape and try to enter the Report Categories page. Enter new password.	New password allows entrance into the Report Categories Page.	OK
Go back to the QRS Home Page and select Send us e-mail with other questions.	Goes to email window with letter addressed to webmaster@spock.lmi.org	OK
Other Observations		

Date: 12/18/96 Initials: PR

QRS010, Report Specification Program Functionality		
Test Procedure	**Expected Results**	**Actual Results**
For each report: print the first page, check the output against the printout of the same report from the previous QRS010 that was completed , check the data for errors, and check the report for overall correctness	see report printouts	
From the Report Categories page, select **AIRPORT DATA.**	Goes to Airport Data page	OK
1. Select ASAC Departures Forecast - Equipment Level (sorted by aircraft arrival delay) a. OAG Dep Code=JFK b. OAG Dep Code=<none> c. OAG Dep Code=XYZ	a. see printout b. does not generate report, gives error message c. does not generate report, gives error message	OK
2. Select ASQP Departure & Arrival Delays (ranked by average arrival delay) Year=1995	see printout	OK
3. Select ASQP Departure & Arrival Delays (ranked by average departure delay) Year=1995	see printout	OK
4. Select ASQP Departure & Arrival Delays (ranked by total of departure and arrival delay) Year=1995	see printout	OK
5. Select ASQP and T-3 Ratios and Scaling Factors (sorted by airport code)	see printout	OK
6. Select DOT Airport Statistics (ranked by T-100 revenue passenger miles) Year=1994	see printout	OK
7. Select DOT Airport Statistics (ranked by T-3 enplaned passengers) Year=1994	see printout	OK
8. Select DOT Airport Statistics (ranked by T-3 scheduled departures) Year=1994	see printout	OK
9. Select OAG Airport Departures - Carrier Level (sorted by carrier name) a. OAG Dep Code=JFK b. OAG Dep Code=<none> c. OAG Dep Code=XYZ	a. see printout b. does not generate report, gives error message c. does not generate report, gives error message	OK
10. Select OAG Airport Departures - Equipment Level (sorted by aircraft type) a. OAG Dep Code=JFK b. OAG Dep Code=<none> c. OAG Dep Code=XYZ	a. see printout b. does not generate report, gives error message c. does not generate report, gives error message	OK
11. Select OAG Airport Statistics	a. see printout	OK

QRS010, Report Specification Program Functionality		
Test Procedure	**Expected Results**	**Actual Results**
(ranked by number of departures) a. OAG Dep Code=JFK b. OAG Dep Code=<none> c. OAG Dep Code=XYZ	b. see printout c. does not generate report, gives error message	
12. Select OAG Airport Statistics (ranked by number of passengers) a. OAG Dep Code=JFK b. OAG Dep Code=<none> c. OAG Dep Code=XYZ	a. see printout b. see printout c. does not generate report, gives error message	OK
13. Select OAG Airport Statistics (ranked by revenue passenger miles) a. OAG Dep Code=JFK b. OAG Dep Code=<none> c. OAG Dep Code=XYZ	a. see printout b. see printout c. does not generate report, gives error message	OK
14. Select OAG Daily Departures & Arrivals Statistically Average Day for 1993 TAP Airport=ATL	see printout	OK
15. Select OAG Daily Departures & Arrivals Statistically Average Day for a Specific Day of the Week Day of week=Sunday TAP Airport=ATL	see printout	OK
16. Select OAG Daily Departures & Arrivals Statistically Average Day for a Specific Month Month=January TAP Airport=ORD	see printout	OK
17. Select OAG Daily Departures & Arrivals - Specific Carrier Statistically Average Day for 1993 TAP Airport=ATL a. OAG Carrier Code=AA b. OAG Carrier Code=<none>	a. see printout b. does not generate report, gives error message	OK
18. Select OAG Daily Departures & Arrivals - Specific Carrier Statistically Average Day for a Specific Day of the Week TAP Airport=ATL Day of week=Sunday a. OAG Carrier Code=AA b. OAG Carrier Code=<none>	a. see printout b. does not generate report, gives error message	OK
19. Select OAG Daily Departures & Arrivals - Specific Carrier Statistically Average Day for a Specific Month TAP Airport=ATL Month=January a. OAG Carrier Code=AA b. OAG Carrier Code=<none>	a. see printout b. does not generate report, gives error message	OK
20. Select OAG Daily Departures & Arrivals - Specific Equipment Statistically Average Day for 1993	a. see printout b. does not generate report, gives error message	OK

QRS010, Report Specification Program Functionality		
Test Procedure	**Expected Results**	**Actual Results**
TAP Airport=ATL a. OAG equ code=737 b. OAG equ code=<none>		
21. Select OAG Daily Departures & Arrivals - Specific Equipment Statistically Average Day for a Specific Day of the Week TAP Airport=ATL Day of week=Sunday a. OAG equ code=737 b. OAG equ code=<none>	a. see printout b. does not generate report, gives error message	OK
22. Select OAG Daily Departures & Arrivals - Specific Equipment Statistically Average Day for a Specific Month TAP Airport=ATL Month=January a. OAG equ code=737 b. OAG equ code=<none>	a. see printout b. does not generate report, gives error message	OK
23. Select TAF Airport Data (ranked by practical annual capacity) a. TAF airport code=LAX b. TAF airport code=<none> c. TAF airport code=XYZ	a. see printout b. see printout c. does not generate report, gives error message	OK
24. Select TAF Operations - All Airports for One Year (ranked by total operations) Year=1994	see printout	OK
25. Select TAF Operations - One Airport for All Years (sorted by year) a. TAF airport code=LAX b. TAF airport code=<none> c. TAF airport code=XYZ	a. see printout b. does not generate report, gives error message c. does not generate report, gives error message	OK
From the Report Categories page, select **CARRIER DATA**	Goes to Carrier Data page	OK
1. Air Carrier Balance Sheet Information (ranked by net stockholders' equity) Year=1995	see printout	OK
2. Air Carrier Group1 Operating Costs (sorted by carrier name Year=1994 a. DOT entity code=A b. DOT entity code=<none> c. DOT entity code=X	a. see printout b. see printout c. does not generate report, gives error message	OK
3. Air Carrier Group 2 and 3 Operating Costs (sorted by carrier name) Year=1994 a. DOT entity code=A b. DOT entity code=<none> c. DOT entity code=X	a. see printout b. see printout c. does not generate report, gives error message	OK
4. Air Carrier Operating Ratios - Other Airlines (sorted by carrier name) Year=1994	see printout	OK
5. Air Carrier Operating Ratios -	see printout	OK

QRS010, Report Specification Program Functionality		
Test Procedure	**Expected Results**	**Actual Results**
Scheduled Airlines (sorted by carrier name) Year=1994		
6. Air Carrier Profit & Loss Information (sorted by carrier name) Year=1994 a. DOT entity code=A b. DOT entity code=<none> c. DOT entity code=X	a. see printout b. see printout c. does not generate report, gives error message	OK
7. Air Carrier Profitability Ratios (sorted by carrier name) Year=1994	see printout	OK
8. Aircraft Inventory by Carrier (ranked by inventory count) Year=1995	see printout	OK
9. Aircraft Inventory for a Specific Carrier (ranked by inventory count) Year=1995 a. OAG carrier code=<none>, DOT carrier code=<none b. OAG carrier code=UA, DOT carrier code=<none> c. OAG carrier code=<none>, DOT carrier code=UA d. OAG carrier code=UA, DOT carrier code=UA	a. see printout b. see printout c. see printout d. see printout (is invalid input)	OK
10. Airport-Specific Operational Data for a Given Carrier (ranked by revenue passenger miles) a. OAG carrier code=UA b. OAG carrier code=<none>	a. see printout b. does not generate report, gives error message	OK
11. B43 Aircraft Inventory - Distribution of Aircraft (for a given carrier) a. DOT carrier code=UA b. DOT carrier code=<none>	a. see printout b. see printout	OK
12. Direct Operating Cost Ratios - Carrier Level (sorted by carrier name) Year=1994	see printout	OK
13. Equipment-Specific Operational Data for a Given Carrier (ranked by stage length) a. OAG carrier code=UA b. OAG carrier code=<none>	a. see printout b. does not generate report, gives error message	OK
14. Flight Segment Means & Standard Deviations - Carrier Level (ranked by stage length) Year=1994 a. DOT departure code=LAX, DOT arrival code=JFK, DOT carrier code=UA b. DOT departure code=LAX, DOT arrival code=<none>, DOT carrier code=UA c. DOT departure code=LAX, DOT arrival code=<none>, DOT carrier code=<none>	a. see printout b. see printout c. see printout d. does not generate report, gives error message	OK

QRS010, Report Specification Program Functionality		
Test Procedure	**Expected Results**	**Actual Results**
d. DOT departure code=<none>, DOT arrival code=<none>, DOT carrier code=<none>		
15. OAG Carrier Level Data - Cargo Aircraft (sorted by carrier name)	see printout	OK
16. OAG Carrier Level Data - Passenger Aircraft (sorted by carrier name)	see printout	OK
17. Productivity Measures - Carrier Level (sorted by carrier name) Year=1994 a. Carrier type=S b. Carrier type=<none>	a. see printout b. see printout	OK
From the Report Categories page, select **EQUIPMENT DATA**	goes to Equipment Data page	OK
1. Aircraft Inventory by Model (ranked by inventory count) Year=1995	see printout	OK
2. Aircraft Inventory for a Specific Model (ranked by inventory count) Year=1995 a. Model name=B-757 b. Model name=<none> c. Model name=XXX	a. see printout b. see printout c. should give error	OK
3. Aircraft Inventory for a Specific Model by Airline (ranked by inventory count) Year=1995 a. Model name=B-757, series=200 b. Model name=B-757, series=<none> c. Model name=<none>, series=<none>	a. see printout b. see printout c. see printout	OK
4. B43 Aircraft Inventory - Distribution of Carriers (for a given equipment code) a. DOT model code=868 b. DOT model code=<none> c. DOT model code=XXX	a. see printout b. does not generate report, gives error message c. does not generate report, gives error message	OK
5. Cost and Operational Data - Equipment Level (sorted by aircraft type, model name) Year=1993 a. Carrier type=S b. Carrier type=<none> c. Carrier type=X	a. see printout b. see printout c. does not generate report, gives error message	OK
6. Direct Operating Cost Ratios - Equipment Level (sorted by model name) Year=1994	see printout	OK
7. Flight Segment Means & Standard Deviations - Equipment Level (ranked by stage length) Year=1994	a. no output b. see printout c. see printout d. does not generate report, gives	OK

QRS010, Report Specification Program Functionality		
Test Procedure	**Expected Results**	**Actual Results**
a. DOT model code=868, DOT depart code=LAX, DOT arrive code=ORD b. DOT model code=868, DOT depart code=LAX, DOT arrive code=<none> c. DOT model code=868, DOT depart code=<none>, DOT arrive code=<none> d. DOT model code=<none>, DOT depart code=<none>, DOT arrive code=<none>	error message	
8. OAG Equipment Level Data - Cargo Aircraft (sorted by model name)	see printout	OK
9. OAG Equipment Level Data - Passenger Aircraft (sorted by model name)	see printout	OK
10. Productivity Measures - Equipment Level (sorted by model name) Year=1994	see printout	OK
From the Report Categories page, select **FLIGHT SEGMENT DATA**	goes to Flight Segment page	OK
1. ASQP Flight Delays by Flight Segment (ranked by total flight delay minutes) Year=1995 a. Depart code=LAX, arrive code=ORD b. Depart code=LAX, arrive code=<none> c. Depart code=<none>, arrive code=<none> d. Depart code=XXX, arrvie code=<none>	a. see printout b. see printout c. see printout d. should give error message	OK
2. DOT Flight Segment Data - Carrier Level (sorted by carrier name) Year=1994 a. Depart code=LAX, arrive code=ORD b. Depart code=LAX, arrive code=<none> c. Depart code=<none>, arrive code=<none>	a. see printout b. see printout c. does not generate report, gives error message	OK
3. DOT Flight Segment Data - Equipment Level (sorted by model name) Year=1994 a. Depart code=LAX, arrive code=ORD b. Depart code=LAX, arrive code=<none> c. Depart code=<none>, arrive code=<none>	a. see printout b. see printout c. does not generate report, gives error message	OK
4. OAG Flight Segment Data - Carrier Level (ranked by revenue passenger miles)	a. see printout b. see printout	OK

QRS010, Report Specification Program Functionality		
Test Procedure	**Expected Results**	**Actual Results**
a. Depart code=LAX, arrive code=ORD, carrier code=UA b. Depart code=LAX, arrive code=<none>, carrier code=<none> c. Depart code=LAX, arrive code=<none>, carrier code=UA d. Depart code=<none>, arrive code=<none>, carrier code=<none>	c. see printout d. does not generate report, gives error message	
5. OAG Flight Segment Data - Equipment Level (ranked by revenue passenger miles) a. Depart code=LAX, arrive code=ORD, equipment code=D10 b. Depart code=<none>, arrive code=<none>, equipment code=D10 c. Depart code=LAX, arrive code=<none>, equipment code=D10 d. Depart code=<none>, arrive code=<none>, equipment code=<none>	a. see printout b. see printout c. see printout d. does not generate report, gives error message	OK
6. OAG Top Flight Segments (ranked by flight count) a. Depart code=LAX, arrive code=ORD b. Depart code=LAX, arrive code=<none> c. Depart code=<none>, arrive code=<none>	a. see printout b. see printout c. see printout	OK
7. OAG Top Flight Segments (ranked by number of passengers) a. Depart code=LAX, arrive code=ORD b. Depart code=LAX, arrive code=<none> c. Depart code=<none>, arrive code=<none	a. see printout b. see printout c. see printout	OK
8. OAG Top Flight Segments (ranked by revenue passenger miles) a. Depart code=LAX, arrive code=ORD b. Depart code=LAX, arrive code=<none> c. Depart code=<none>, arrive code=<none	a. see printout b. see printout c. see printout	OK
9. T-100 Top Flight Segments (ranked by flight count) Year=1994 a. Depart code=LAX, arrive code=ORD b. Depart code=LAX, arrive code=<none>	a. see printout b. see printout c. see printout	OK

QRS010, Report Specification Program Functionality		
Test Procedure	**Expected Results**	**Actual Results**
c. Depart code=<none>, arrive code=<none>		
10. T 100 Top Flight Segments (ranked by number of passengers) Year=1994 a. Depart code=LAX, arrive code=ORD b. Depart code=LAX, arrive code=<none> c. Depart code=<none>, arrive code=<none>	a. see printout b. see printout c. see printout	OK
11. T-100 Top Flight Segments (ranked by revenue passenger miles) Year=1994 a. Depart code=LAX, arrive code=ORD b. Depart code=LAX, arrive code=<none> c. Depart code=<none>, arrive code=<none>	a. see printout b. see printout c. see printout	OK
From the Report Categories page, select **Jet Engine Data**	Goes to the Jet Engine Data page	OK
1. Distribution of Aircraft Powered by a Specific Engine (ranked by engine count) Year=1995 a. Engine code=1 b. Engine code=<none>	a. see printout b. see printout	OK
2. Distribution of Engines Mounted on a Specific Model (sorted by model and series) a. model name=B-737, series name=200 b. model name= B-737, series name=<none> c. model name= B-737, series name=<none>	a. see printout b. see printout c. see printout	OK
3. Jet Engine Inventory (ranked by engine count) Year=1995	see printout	OK
4. Jet Engine Inventory by Manufac-turer (ranked by engine count) Year=1995	see printout	OK
From the Report Categories page, select **Origin & Destination Data**	Goes to Origin & Destination Data page	OK
1.Origin & Destination - Airport Pairs (ranked by average coupons used) Year=1994 a. origin code=ORD, destination code=LAX b. origin code=ORD, destination code=<none> c. origin code=<none>, destination code=<none>	a. see printout b. see printout c. see printout	OK
2.Origin & Destination - Airport Pairs	a. see printout	OK

QRS010, Report Specification Program Functionality		
Test Procedure	**Expected Results**	**Actual Results**
(ranked by average fare) Year=1994 a. origin code=ORD, destination code=LAX b. origin code=ORD, destination code=<none> c. origin code=<none>, destination code=<none>	b. see printout c. see printout	
3.Origin & Destination - Airport Pairs (ranked by circuity factor) Year=1994 a. origin code=ORD, destination code=LAX b. origin code=ORD, destination code=<none> c. origin code=<none>, destination code=<none>	a. see printout b. see printout c. see printout	OK
4.Origin & Destination - Airport Pairs (ranked by domestic passenger count) Year=1994 a. origin code=ORD, destination code=LAX b. origin code=ORD, destination code=<none> c. origin code=<none>, destination code=<none>	a. see printout b. see printout c. see printout	OK
5.Origin & Destination - Airport Pairs (ranked by domestic passenger revenues) Year=1994 a. origin code=ORD, destination code=LAX b. origin code=ORD, destination code=<none> c. origin code=<none>, destination code=<none>	a. see printout b. see printout c. see printout	OK
6.Origin & Destination - Airport Pairs (ranked by percent of zero fare passengers ascending) Year=1994 a. origin code=ORD, destination code=LAX b. origin code=ORD, destination code=<none> c. origin code=<none>, destination code=<none>	a. see printout b. see printout c. see printout	OK
7.Origin & Destination - Airport Pairs (ranked by percent of zero fare passengers descending) Year=1994 a. origin code=ORD, destination code=LAX b. origin code=ORD, destination	a. see printout b. see printout c. see printout	OK

QRS010, Report Specification Program Functionality		
Test Procedure	**Expected Results**	**Actual Results**
code=<none> c. origin code=<none>, destination code=<none>		
8.Origin & Destination - Airport Pairs (ranked by traditional yield) Year=1994 a. origin code=ORD, destination code=LAX b. origin code=ORD, destination code=<none> c. origin code=<none>, destination code=<none>	a. see printout b. see printout c. see printout	OK
9.Origin & Destination - Airport Totals (ranked by O & D matrix enplaned passengers) Year=1994	see printout	OK
10.Origin & Destination - Airport Totals (ranked by outbound domestic passenger revenues) Year=1994	see printout	OK
11.Origin & Destination - Airport Totals (ranked by ratio of O & D to T-3) Year=1994	see printout	OK
12.Origin & Destination - Airport Totals (ranked by ratio of inbound to outbound initiated trips) Year=1994	see printout	OK
13.Origin & Destination - Airport Totals (ranked by sum of inbound and outbound international passengers) Year=1994	see printout	OK
14.Origin & Destination - City Pairs (ranked by domestic passengers) Year=1994	see printout	OK
15.Origin & Destination - City Pairs (ranked by domestic revenue) Year=1994	see printout	OK
16.Origin & Destination - City Totals (ranked by O & D matrix enplaned passengers) Year=1994	see printout	OK
17.Origin & Destination - City Totals (ranked by outbound domestic passenger revenues) Year=1994	see printout	OK
18.Origin & Destination - City Totals (ranked by ratio of O & D to T-3) Year=1994	see printout	OK
19.Origin & Destination - City Totals (ranked by ratio of inbound to outbound initiated trips) Year=1994	see printout	OK
20.Origin & Destination - City Totals (ranked by sum of inbound and outbound international passengers)	see printout	OK

QRS010, Report Specification Program Functionality		
Test Procedure	**Expected Results**	**Actual Results**
Year=1994		
From the Report Categories page, select **Miscellaneous (includes Airport and Carrier Codes)**	Goes to the Miscellaneous page	OK
1.Carrier Codes and Names (sorted by carrier code)	see printout	OK
2.Carrier Codes and Names (sorted by carrier name)	see printout	OK
3.DOT Codes and Place Names (sorted by place name) a. place=Los_Angeles b. place=<none>	a. see printout b. see printout	OK
4.OAG Codes and Place Names (sorted by place name) a. place=A_ b. place=<none>	a. see printout b. see printout	OK
5.TAF Codes and Place Names (sorted by place name) a. place=Los_Angeles b. place=<none>	a. see printout b. see printout	OK

Other Observations
There are some "DIV/0!" errors. They are not report generated errors. They are holes in the data (no available data).

Date: 12/12/96 Initials: PR

QRS020, Report Generation Program Functionality		
Test Procedure	**Expected Results**	**Actual Results**
1. From any report category, select a report . Next to the "Spreadsheet Type" option, select "PC/MAC Excel" Using the Microsoft Excel program, verify the validity of the format.	All columns appear as expected with valid data	OK
2. From any report category, select a report. Next to the "Spreadsheet Type" option, select "UNIX Viewer" Using the Xrview program downloaded from the ASAC home page, verify the validity of the format.	All columns appear as expected with valid data	OK
3. From any report category, select a report. Next to the "Delivery Option" select "mail notification". Verify that upon completion of report that a message is mailed to the correct email address.	World Wide Web Server <www@spock.lmi.org> mails notification with subject: "ASAC QRS Report Notification"	OK
4. Verify that the report exists in the users/ftp/pub/Reports directory with the specified name in the email message and is available via anonymous ftp.	Report is available	OK
5. From any report category, select a report. Next to the "Delivery Option" select "mail report". Verify that the report is mailed in the correct form to the correct email address.	World Wide Web Server <www@spock.lmi.org> mails report with subject: "ASAC QRS Report"	OK
6. From any report category, select a report. Next to the "E-mail address" option enter an address other than the one defaulted to the user.	Report notification is mailed to the new supplied address.	OK
7. Repeat steps 1-6 on all platforms not executed on in steps 1-6: a. UNIX b. Macintosh c. Windows		OK
Other Observations		
Everything in good working order.		

Date: 12/13/96 Initials: PR

QRS030, Report File Viewer Download and Installation - HP		
Test Procedure	**Expected Results**	**Actual Results**
1. Go to the ASAC "Download ASAC QRS X Window System Report Viewer" page (from the report server)	Goes to "Download ASAC QRS X Window System Report Viewer" page (http://www.asac.lmi.org/access/rview.html)	OK
2. Select the "HP-UX 9.X or above" option	Goes to "Download ASAC QRS X Window System Report Viewer" page	OK
3. Select "Tape Archive (tar) - Compressed with compress (.Z)" option. Uncompress and unpack the files into an executable. Use the install program to set up the xrviewer into a directory. Verify that the viewer runs. Download a report and view it to verify functionality.	Computer receives compressed (.Z) tar file. After uncompressed and unpacked the install program installs copy of viewer into specified directory. Xrviewer executes and views report correctly.	OK
4. Select "Tape Archive (tar) - Compressed with gzip (.gz)" option. Uncompress and unpack the files into an executable. Use the install program to set up the xrviewer into a directory. Verify that the viewer runs. Download a report and view it to verify functionality.	Computer receives compressed (.gz) tar file. After uncompressed and unpacked the install program installs copy of viewer into specified directory. Xrviewer executes and views report correctly.	OK
5. Select "Shell Archive (shar) - Uncompressed)" option. Unpack the files into an executable. Use the install program to set up the xrviewer into a directory. Verify that the viewer runs. Download a report and view it to verify functionality.	Computer receives uncompressed shell archive (.shar). After unpacked the install program installs copy of viewer into specified directory. Xrviewer executes and views report correctly.	OK
Other Observations		
Everything working great		

Date: 12/16/96 Initials: PR

QRS031, Report File Viewer Functionality - HP		
Test Procedure	**Expected Results**	**Actual Results**
1. Test the functionality of the file viewer. Compare results of the file view to files viewed using Excel. Ensure calculations performed by the file viewer are accurate by comparing results to results obtained for same calculations using Excel.	Viewer gives same results as Excel.	OK
2. Test the functionality of commands available with the file viewer. Ensure instructions for using the commands are clear, accurate, and complete.	All commands work properly (save, save as, open, formatted and unformatted view)	OK
3. Ensure files saved in comma-delimited and tab-delimited formats are correctly saved in the specified format.	UNIX viewer saves and views the tab delimited formats correctly	OK
Other Observations		
HP viewer works fine.		

Date: 12/16/96 Initials: PR

QRS033, Report File Viewer Download and Installation - SunOS		
Test Procedure	**Expected Results**	**Actual Results**
1. Go to the ASAC "Download ASAC QRS X Window System Report Viewer" page (from the report server)	Goes to "Download ASAC QRS X Window System Report Viewer" page (http://www.asac.lmi.org/access/rview.html)	Not done for this test
2. Select the "SunOS 5.4 or above" option	Goes to "Download ASAC QRS X Window System Report Viewer" page	Not done for this test
3. Select "Tape Archive (tar) - Compressed with compress (.Z)" option. Uncompress and unpack the files into an executable. Use the install program to set up the xrviewer into a directory. Verify that the viewer runs. Download a report and view it to verify functionality.	Computer receives compressed (.Z) tar file. After uncompressed and unpacked the install program installs copy of viewer into specified directory. Xrviewer executes and views report correctly.	Not done for this test
4. Select "Tape Archive (tar) - Compressed with gzip (.gz)" option. Uncompress and unpack the files into an executable. Use the install program to set up the xrviewer into a directory. Verify that the viewer runs. Download a report and view it to verify functionality.	Computer receives compressed (.gz) tar file. After uncompressed and unpacked the install program installs copy of viewer into specified directory. Xrviewer executes and views report correctly.	Not done for this test
5. Select "Shell Archive (shar) - Uncompressed)" option. Unpack the files into an executable. Use the install program to set up the xrviewer into a directory. Verify that the viewer runs. Download a report and view it to verify functionality.	Computer receives uncompressed shell archive (.shar). After unpacked the install program installs copy of viewer into specified directory. Xrviewer executes and views report correctly.	Not done for this test
Other Observations		
Jim Villani has accounts on SunOS's and has tested the SunOS installation.		

Date: 12/16/96 Initials: PR

QRS034, Report File Viewer Functionality - SunOS		
Test Procedure	**Expected Results**	**Actual Results**
1. Test the functionality of the file viewer. Compare results of the file view to files viewed using Excel. Ensure calculations performed by the file viewer are accurate by comparing results to results obtained for same calculations using Excel.	Viewer gives same results as Excel.	Not done for this test
2. Test the functionality of commands available with the file viewer. Ensure instructions for using the commands are clear, accurate, and complete.	All commands work properly (save, save as, open, formatted and unformatted view)	Not done for this test
3. Ensure files saved in comma-delimited and tab-delimited formats are correctly saved in the specified format.	UNIX viewer saves and views the tab delimited formats correctly	Not done for this test
Other Observations		
Jim Villani has an account on a SunOS machine and has tested the viewer on that platform.		

Date: 12/17/96 Initials: PR

QRS035, Report File Viewer Download and Installation - SGI		
Test Procedure	**Expected Results**	**Actual Results**
1. Go to the ASAC "Download ASAC QRS X Window System Report Viewer" page (from the report server)	Goes to "Download ASAC QRS X Window System Report Viewer" page (http://www.asac.lmi.org/access/rview.html)	Not done for this test
2. Select the "SGI IRIX 5.3 or above" option	Goes to "Download ASAC QRS X Window System Report Viewer" page	Not done for this test
3. Select "Tape Archive (tar) - Compressed with compress (.Z)" option. Uncompress and unpack the files into an executable. Use the install program to set up the xrviewer into a directory. Verify that the viewer runs. Download a report and view it to verify functionality.	Computer receives compressed (.Z) tar file. After uncompressed and unpacked the install program installs copy of viewer into specified directory. Xrviewer executes and views report correctly.	Not done for this test
4. Select "Tape Archive (tar) - Compressed with gzip (.gz)" option. Uncompress and unpack the files into an executable. Use the install program to set up the xrviewer into a directory. Verify that the viewer runs. Download a report and view it to verify functionality.	Computer receives compressed (.gz) tar file. After uncompressed and unpacked the install program installs copy of viewer into specified directory. Xrviewer executes and views report correctly.	Not done for this test
5. Select "Shell Archive (shar) - Uncompressed)" option. Unpack the files into an executable. Use the install program to set up the xrviewer into a directory. Verify that the viewer runs. Download a report and view it to verify functionality.	Computer receives uncompressed shell archive (.shar). After unpacked the install program installs copy of viewer into specified directory. Xrviewer executes and views report correctly.	Not done for this test
Other Observations		
Jim Villani has an account on an SGI machine and has tested the download on that platform.		

Date: 12/16/96 Initials: PR

QRS036, Report File Viewer Functionality - SGI		
Test Procedure	**Expected Results**	**Actual Results**
1. Test the functionality of the file viewer. Compare results of the file view to files viewed using Excel. Ensure calculations performed by the file viewer are accurate by comparing results to results obtained for same calculations using Excel.	Viewer gives same results as Excel.	Not done for this test
2. Test the functionality of commands available with the file viewer. Ensure instructions for using the commands are clear, accurate, and complete.	All commands work properly (save, save as, open, formatted and unformatted view)	Not done for this test
3. Ensure files saved in comma-delimited and tab-delimited formats are correctly saved in the specified format.	UNIX viewer saves and views the tab delimited formats correctly	Not done for this test
Other Observations		
Jim Villani has an account on an SGI machine and has tested the viewer on that platform.		

Date: 12/17/96 Initials: PR

SI001, Help/Informational Text Accuracy		
Test Procedure	**Expected Results**	**Actual Results**
1. Go to the ASAC QRS Home Page	Goes to ASAC QRS Home Page	OK
2. Select "Definitions of Key Terms" Ensure that the page is understandable and information can be easily found. Go back.	Definitions are understandable, well organized, and comprehensive	OK
3. Select "Data Source Descriptions" Ensure that the page is understandable and information can be easily found. Go back.	Data source descriptions are understandable, well organized, and comprehensive	OK
4. Select On-Line Help. Scan through the On-Line help to make sure it is easily understandable and accurate. Read the title headings to make sure all necessary topics are covered.	On-Line help is understandable, well organized, and comprehensive	OK
Other Observations		

Date: 12/23/96 Initials: PR

SI020, Error/Error Log/System Error Message Functionality		
Test Procedure	**Expected Results**	**Actual Results**
Validate system response due to user error a. no e-mail address b. wrong email address c. wrong input or no input variables on a report	a. gives error, writes to error log b. sends email with error message to default email address c. gives error, does not write to error log	OK
Validate returned messages due to a database problem or report generation problem by generating a report with no output: from the jet engine data report category, select "Distribution of Engines Mounted on a Specific Model (sorted by model and series)" with code=A300 and series=1000	Sends report notification that it has generated an empty report	OK
Verify that the system handles interrupted transfer. Abort transfer of data (press ESC in Netscape) and check error log	Writes the time, user, and error to the error log	OK
Exit browser and attempt to access the QRS database with a. an invalid user id b. an invalid password for a valid user	Both cases deny access and write to the error log	OK
Other Observations		

Date: 12/23/96 Initials: PR

SI030, User Access, System Log Procedures and Validity		
Test Procedure	**Expected Results**	**Actual Results**
1. In the WWW server Global Access Configuration File, ensure the following directives are present in a Directory section: • AuthType Basic • AuthName *dirname* • AuthUserFile *file* (example, AuthUserFile/ webaccess/auth/ user.auth)	Directives are present.	
2. Ensure the following limit statement is contained in the same Directory section: • Require user *name*	Limit statement is present.	
3. Add 'Require user Weeble' to the Limit section of step 2. Add ki98tyer to the file listed after the AuthUserFile directive of step 1.	User name and password are successfully added.	
4. Log into the WWW server using the id/password combination Weeble/ki98tyer.	Login is successful.	
5. Log into the WWW server using the id/password combination Weeble/invalid.	Login is not successful. Error message is displayed.	
6. Remove 'Require user Weeble' from the Limit section of step 2. Remove ki98tyer from the file listed after the AuthUserFile directive of step 1.	User name and password are successfully removed.	
7. Log into the WWW server using the id/password combination Weeble/ki98tyer.	Login is not successful. Error message is displayed.	
8. Ensure password are required to be alphanumeric and at least 6 characters.		OK
9. Ensure a process exists for requesting a new account, forgotten password, etc.	A process exists for requesting a new account, forgotten password, etc.	

SI030, User Access, System Log Procedures and Validity		
Test Procedure	**Expected Results**	**Actual Results**
10. Ensure procedures exist to periodically compress, inspect, and archive the Server Access Log and Server Error Log files.	Procedures exist to periodically compress, inspect, and archive the Server Access Log and Server Error Log files.	
11. View the Server Access Log. Ensure information is in the following format, and contains relevant information: s115.infonet.net - - [dd/mon/year: hh:mm:ss -500] GET /dir/dir/doc.name HTTP /1.0 200 3599 where s115.infonet.net is the requesting address, dd/…is the date and time of the request, GET is the HTTP method, 1.0 is the HTTP protocol level, 200 is the status (200 = OK), and 3599 is the number of bytes transferred.	Information contained in the Server Access Log is in the correct format, and contains relevant information (e.g., addresses and document names reflect downloads performed during previous Test Scenarios).	
12. View the Server Error Log. Ensure information is in the following format, and contains relevant information: [dd/mon/year: hh:mm:ss -500] /dir/dir/doc.name failed for s115.infonet.net, reason: client denied by server configuration and/or [dd/mon/year: hh:mm:ss -500] httpd: access to /dir/dir/doc.name failed for s115.infonet.net, reason: file does not exist and/or [dd/mon/year: hh:mm:ss -500] server timeout for s115.infonet.net, reason: ….	Information contained in the Error Access Log is in the correct format, and contains relevant information (e.g., errors reflect procedures performed during previous Test Scenarios).	OK
13. Select ASAC Server Usage from the ASAC Home Page. Ensure the ASAC Server Usage log report accurately reflects server usage and	The ASAC Server Usage log report accurately reflects server usage and selected information from the Access Log.	OK

SI030, User Access, System Log Procedures and Validity		
Test Procedure	**Expected Results**	**Actual Results**
selected information from the Access Log.		
Other Observations		

Date: 12/23/96 Initials: PR

MBR001, Server Maintenance Mode		
Test Procedure	**Expected Results**	**Actual Results**
1. Perform tape backup on system (either partial or complete).	Backup copies necessary files	OK
2. Attempt to access the ASAC Home Page while the tape backup is being performed.	Ensure the ASAC Home Page is accessible.	OK
3. Move between many WWW pages (ASAC Home Page, Report Category Page, Report Selection Page, and Data Entry Page).	Ensure all selected WWW pages are accessible with no noticeable system degradation.	OK
4. Place server in maintenance mode (total shutdown).	Server goes into maintenance mode	Not done
5. Attempt to access the ASAC Home Page.	Ensure the ASAC Home Page is not accessible.	Not done
Other Observations		
4 and 5 were not performed to prevent interference with the ASAC system. These steps were tested during the QRS beta test period.		

Date: 12/13/96 Initials: PR

MBR002, System Recovery		
Test Procedure	**Expected Results**	**Actual Results**
1. Shut down and restart server (mimic hardware failure and replacement). Perform necessary administrative actions.	Server shuts down	Not performed
2. Note the time required to restore system to full operation.	Should restore to full operation in approximately 10 minutes.	Time required to restore system to full operation is _____. **Not performed**
3. Verify all ASAC server functions operate properly.	All ASAC server functions operate properly.	Not performed
4. Use backup tape(s) to restore ASAC system. Note: can perform this on a different hardware platform, if available, to avoid interference with ASAC operation and development activities.	Backup tapes copy all necessary files and restore the ASAC system in full.	Not performed
5. Note the time required to restore system to full operation.		Time required to restore system to full operation is _____. **Not performed**
6. Verify all ASAC server functions operate properly.	All ASAC server functions operate properly.	Not performed

Other Observations

This test was not performed because it would cause interference with ASAC operations. It is assumed that since backups have been performed previously and recovery from tapes has been successful in the past, that these test procedures will work OK.

Date: 12/13/96 Initials: PR

Appendix E
Problem Reports

Two-hundred and sixty-two PRs were written during QRS testing. Of these reports, all but eighteen are still being worked. The PRs and their status are described in Table E-1.

Table E-1. QRS Problem Report Description and Status

PR Number	Problem Description	Status
1	Report list pages are too busy. Suggest either deleting sources from the report list, only placing the report title in HTML tags, or both.	Closed
2	Help for variable fill-in. Suggest providing access to a list of valid variables on the report request page.	Closed
3	Variable names on report request page. The variable names on the report request page should be presented as text only (no underlines)	Closed
4	Add information to mail message. Need a way to distinguish between multiple mailed reports. Suggest adding report name and selected arguments to mail message.	Closed
5	Possible for users to overwrite reports. A note should be added to the report information page stating users should be cautious when downloading a new report because the new report could have the same file name as an existing report on the user's system	Closed
6	Download when expecting mail. It is confusing to the user when the first time a report is requested via 'mail report' option the report is mailed to the user, and the next time the report is requested via 'mail report' the 'download' page appears and the	Closed
7	Possible user confusion finding Excel report. A note should be added to the report information page stating users must change the 'open file type' in Excel from Excel Files (*.xls) to All Files (*.*) in order to open the report received from ASAC as XXX.	Closed
8	Airport Data Reports #s 19 - 20. The report titles should all either say Equipment or Model.	Closed

Table E-1. QRS Problem Report Description and Status (Con't.)

PR Number	Problem Description	Status
12	Long input string in data entry field crashes software. A longer than expected input string in the data entry fields will crash the software.	Closed
13	Spelling error - circuity should be circuitry. In Origin & Destination Data, Report #3, circuity should be circuitry.	Closed
14	Cannot run reports with Entity data entry field. Receive errors when trying to run a report that contains an Entity data entry field, e.g., Airline Data, Air Carrier Group 1 Operating Costs. Tried entering both the entity code and entity name.	Closed
15	Aircraft inventory for a specific carrier report- are both OAG and DOT airline codes required? The above report asks for both OAG and DOT airline codes. Entered only one of the codes and received a warning message in the e-mail message sent with the rep	Closed
16	Flight segment mean & std dev report asks for an airline code. Aircraft inv for a specific carrier report asks for OAG and DOT airline codes. Which code should be used for the Flight segment mean & std dev report? See related PR # 15.	Closed
17	Could not run Direct operating cost rations - carrier level report. Received an error "invalid column name YEAR" when requested the above report.	Closed
18	Aircraft Days, Carrier Route are together in the column heading in Air carrier operating ratios reports. One of the columns of data is missing. Aircraft Days and Carrier Route should be separate columns in the reports.	Closed
19	Divide by zero errors in Air carrier operating ratios - other airlines report. Many divide by zero errors for Emerald Air Lines, 1991, in the above report.	Closed
20	Air carrier profitability ratios report: display Carrier Name and Current Assets headings on two rows to be consistent with other headings in the report and with other reports.	Closed
21	Air carrier balance sheet information report - Carrier heading should be DOT Carrier Code to explain data and to be consistent with other reports.	Closed
22	Aircraft inventory by carrier report - some of the airline names are in all caps. This is inconsistent within the report and with other reports.	Closed

Table E-1. QRS Problem Report Description and Status (Con't.)

PR Number	Problem Description	Status
23	Mesage on the DOT codes and place names screen and the OAG codes and place names screens are contradictory. One message states case is regognized, one states the same case is not recognized. Change the message on the DOT codes and place names screen to	Closed
24	OAG codes and place names recognized WASHINGTON as an OAG place name. DOT codes and place names did not recognize WASHINGTON or other all caps places as a DOT place name. DOT codes and place names did recognize Washington.	Closed
25	For Origin and Destination - Airport Pairs reports, remove the Remainder row when both origin and destination are specified for the report. The row does not serve a purpose in that case. (Report ID: ODFS-ACU)	Closed
27	Remark at top of .dat file reads .REM Generated DATA FILE should identify program it is associated with: .REM Generated ASAC QRS DATA FILE	Closed
28	Distribution of Aircraft Mounting a Specific Engine report - Inventory Model Name column heading is displayed twice. The second Inventory Model Name heading should be Inventory Series Name. (Report ID: AI7)	Closed
29	DOT Model Name should either be Model Name or Inventory Model Name to be consistent with how Series Name is presented. Also, in other reports, the data entry titles are in the order listed under the report title, so in this case, model name should be bef	Closed
30	Inventory Model Name column needs to be wider. Example - for Textron Lycoming ALF502R, the inventory model name is displayed as 'BAE-146-100'. The 'and RJ70' part is cut off. User may not realize that the column needs to be widened to see all the data.	Closed
31	The same information is called different things (origin/destination and departure/arrival). This occurs on many reports in both the heading and data entry request information. We should standardize on either origin/destination or departure/arrival. (Re	Closed
32	For OAG Flight Segment Data reports OAG-FS1, 3, 4, and 5, the Share columns need to be widened to accommodate 100.00%. (Report ID: OAG-FS1)	Closed
33	Ran OAG-FS2 for IAD - HPN. The first row contains 'Includes some double counting' under the Departure Airport heading. This is usually where Total is displayed (the items in the rest of the first row are totals). Suggest displaying data as Total: Incl	Closed
34	Need to widen Model Name and Model Series columns for reports DFSD-EQ1 and OAG-EQ2. (Report ID: DFSD-EQ1)	Closed

Table E-1. QRS Problem Report Description and Status (Con't.)

PR Number	Problem Description	Status
35	For the Productivity Measures - Equipment Level report, the same item is listed as Equipment Model on the WWW page and Equipment Name on the corresponding report. Equipment Name should be changed to Equipment Model on the report. (Report ID: PM1-EQ)	Closed
36	Change the first column from Arrival Airport to Departure Airport in reports OAG-AP2 and OAG-AP1 to be consistent with report OAG-FS2. (Report ID: OAG-AP2)	Closed
37	Request the links to the LMI home page be deleted. There is no NASA related information on the LMI home page. (Report ID: none)	Closed
38	Most of the carrier names in the Airline Inventory by Carrier report are initial caps. Some of the carrier names are all caps. They should all be initial caps. (Report ID: AI3)	Duplicate
39	Capitalize the first letter after the hyphen for the following carriers in ARLNCOD2: Code Carrier RO Tarom-romanian Air Transport LZ Balkan-bulgarian Airlines IR Iran Air-airline of Islam, Rep of Iran KM Air Malta Company L	Closed
40	Widen columns for share in OAG-AIR3, 4, and 5. (Report ID: OAG-AIR3)	Closed
41	Need a way to differentiate between a blank report due to no data for given variables and a blank report due to incorrectly entered variables (e.g. B747 for a carrier code).	Closed
42	Spell out month name in column headings for the OAG-TMMX reports. (Report ID: OAG-TMXX)	Closed
43	Rearrange instructions to be in same order as data entry fields for all OAG-TMXX pages. (Report ID: OAG-TMXX)	Closed
44	After the QRS is operational, remove the Document Server Page and links to the page. Information currently on the Document Server Page will be available either in the QRS or other ASAC reports.	Closed
45	Share data was not calculated for this report (all share data was 0.00%). Received an error message from the report viewer. (Report ID: AI6)	Closed
46	For carrier code KM, add a . after Ltd and a space after -.	Closed
47	Report for the Unix Viewer is not generated correctly. Ran this report using 1989, hpn to iad as input variables. Excel report generated one line of data plus a remainder line. Unix report contained no data, only remainder information. (Report ID: ODFS	Closed

Table E-1. QRS Problem Report Description and Status (Con't.)

PR Number	Problem Description	Status
48	The last row in this report (Rolls-Royce RB146 AVON) has a total number of engines = 0 and share = 0.00%. This is displayed properly on the Excel report, but is displayed as blank and !ERR on the Report Viewer report. The file being read by the viewer	Closed
49	Ran this report for IAD - HPN. The first column of the first row should have a note - Note: totals include some double counting. The note is in the file generated by the RGP, however it is not displayed. (Report ID: OAG-FS2)	Closed
50	Ran this report for HPN - all. The Revenue Passenger Miles and Available Seat Miles columns contain 0 for data. Columns should have valid data. The file does contain data for these two columns, but it does not match what is on the Excel version of the	Closed
51	Cannot run this report for the Unix Report Viewer format. Host takes a long time trying to process the report - then goes to message page although there is no message (no will mail... or download...). Tried to run from Mosaic and had the same problem. (	Closed
52	Cannot view report - Memory fault (coredump) (Report ID: OAG-EQ2)	Closed
53	"Total" is missing from the first column, first row of reports: OAG-AIR3, 4 and 5, OAG-AP1 and 2. (Report ID: OAG-AIRx..)	Closed
54	Could not run report - memory fault - core dump. (Report ID: OAG-EQ2)	Closed
55	Within an inventory count number, the report is sorted in the order of all caps, then initial caps. Result is airlines are not listed in alphabetical order (e.g., FUNWORLD, First Air). Sort reports alphabetically regardless of case. (Report ID: AI3)	Closed
56	Inventory Count column is displayed as @da@... Also, "Total" is missing from the first column, first row. (Report ID: AI4)	Closed
57	The Total Block Minutes value for Unknown airline number 4 is not displayed (blank). Value is in file. Totals are incorrect due to missing data in column. (Report ID: OAG-CA2)	Closed
58	Viewer crashes when loading file (Report ID: OAG-FS2)	Closed
59	Core dump when viewing file. (Report ID: OAG-CA1)	Closed
60	Viewed .slk files on Mac using Excel v4.0. The report headings don't fit in the default row height - the tops of the headings are cut off - e.g., T- looks like I-, etc.	Closed
61	Viewing file on MAC - Excel v4.0 - got error message "cannot read record 31" and file was opened as read-only. Viewed same file from same diskette on my PC and it opened with no errors. Any ideas? (Report ID: OPRATCR1)	Closed

Table E-1. QRS Problem Report Description and Status (Con't.)

PR Number	Problem Description	Status
65	Second page of report does not print correctly. The last column is cut off because it gets near the edge. The right margin of .75 inches is not preserved. (Report ID: DOR-EQ)	Closed
66	5th column is not wide enough - title is desplayed as "rating Property and Equip" (Report ID: BS1)	Closed
67	Memory fault (coredump) when trying to view reports. (Report ID: G23OC,PL)	Closed
68	Total Number of Engines missing data for last 20 rows of report (where Inventory Model Name = Other Aircraft) (Report ID: AI7)	Closed
69	Data is missing in the Group Operating Cost columns. (Report ID: DOR-CAR)	Closed
70	"Total" is missing from the first column, first row of reports: OAG-AIR3, 4 and 5, OAG-AP1 and 2. (Report ID: OAG-AIRx..)	Closed
71	Change column heading Carrier Type to Carrier Type Code. Also change Web page. (Report ID: PM1-CAR)	Closed
73	Crashes on SGI when print dialog called a second time (Report ID: ASQP-AR3)	Closed
74	Crashes on SGI when loading files with blank cells (Report ID: ASQP-AR1)	Closed
75	Crashes on SGI when exiting with no file open (after closing an open file) (Report ID: ASQP-AR3)	Closed
76	Enhancement: Add a REQUESTOR block to the UNIX report after the file name; i.e., .BEGIN REQUESTOR Jim Villani .END REQUESTOR	Rejected
77	Enhancement: Add variable info to UNIX dat file: e.g., .BEGIN REPORTVARS Year=1993 Arrive_Port=PIT .END REPORTVARS	Rejected
78	All web pages should have as their last line (with no links): [Document Title] / Logistics Management Institute / [Document Creation/Modification Date] e.g.: ASAC Document Server / Logistics Management Institute / December 11, 1995	Closed

Table E-1. QRS Problem Report Description and Status (Con't.)

PR Number	Problem Description	Status
79	Need 'loading data, please be patient' while the data file is being loaded (some of them take quite a while.) It seems to take longer to load a file using the file,open dialog, as compared to entering the program with -f option. I've even noticed a prog	Closed
80	Reports which sort by a quotient are not always in perfect order. For example asqp-ar2 and asqp-ar3.	Closed
82	When you are in the lower right hand corner of a report, you cannot scroll to the lower left hand corner by hitting the tab key. You can scroll from the far right column to the far left column in other rows. This is a VERY low priority item, and I enter	Rejected
83	There is a logical statement to calculate load factor in the 9th column that is not being interpretted correctly. The specific causes of the failure are freighter type aircraft because they have no seats or available seat miles. The logical statement do	Closed
84	Column heading for sixth visible column should be labeled "DOT Equipment Code." It presently says "DOT Carrier Code." (Report ID: DFSD-FS1)	Closed
85	For aircraft with a DOT code of 999=Other, there is no way to estimate the total number of engines since the number of engines per aircraft is not listed anywhere. (Report ID: AI5)	Closed
86	The placename for DOT airport code=CAL should say Cambeltown, Scotland, UK. At present, the name is truncated to "beltown." (Report ID: DOT-COD1)	Closed
87	The report in the UNIX Viewer cuts off at row 199 and shows all zeros for the following: ACU, AF, CF, REV, and TY. Again in the UNIX Viewer, the report cuts off at row 2001 and lists an airport's data (rather than a total for the remainder) for the follo	Closed
88	Some SLK files when brought into Excel version 4.0 must be manually scaled, i.e. you cannot use the "fit to x by y pages" feature. (Report ID: oag-ca1)	Closed
89	Add report variable for carrier code on fs2 and equipment code on fs1. Also, sort these reports by RPM now. (Report ID: OAG-FS1,2)	Closed
90	There are some NULL passenger load factors in OAG_NOSHARE_FLIGHT_SEGMENT_DAT	Closed
91	Change Miscellaneous category name to be 'Miscellaneous (including Airport/Airline Codes)'	Closed
92	Add Place Names to these two reports: oag-fs1,2 (Report ID: oag-fs1,2)	Rejected

Table E-1. QRS Problem Report Description and Status (Con't.)

PR Number	Problem Description	Status
93	When the report is already in the cache and I click with the right button to "save as", the default file name has the extension "ewi" instead of the expected "slk." I suspect this is a bug in the MOSAIC windows version because the same problem does not o	Closed
94	Select Enter ASAC QRS link and cancel, receive generic message "...browser not auth. capable or auth. failed.." This could be confusing to the user. Should go to a page that is more explanatory.	Future
95	Page with "The Report will be mailed to you...", Report should be lower case to be consistent with the other messages.	Closed
96	Page with "... requires the following variables...", variables should be variable(s).	Closed
97	Same general problem as PR Number 89. When DFSD-CA1's report variables are left completely blank, the resulting file is 3.79 MB (although it will load into Excel). When DFSD-EQ1's report variables are left completely blank, the resulting file is 8.32 MB	Closed
98	xrview beta code not compiled on SunOS.	Closed
99	Same general problem as PR #97. Both reports can be improved by adding a third report variable, a carrier code for DFSD-FS2 and an equipment code for DFSD-FS1. When I ran them unconstrained, the files were huge at 5.29MB and 11.5MB, respectively, so I k	Closed
100	In the OAG Aircraft Model database, there are nine codes for which the low and high number of seats, respectively, must be modified. The reason is to better match the data found in Jane's All the World's Aircraft and the Form 41. These are: 741, 350, 45	Closed
101	Add security verbiage (re: id/password protection) to Web pages.	Closed
102	Create daily mail message/monthly report of usage/download statistics.	Closed
103	We have the CY94 Form 41 data. Marjie has pulled the raw data and given processed files to Ken. When can we update the info system to include this data? I imagine many of the pull downs for year will have to be updated. It would also be a good idea to	Closed
104	At the end of last year, Ken and I put together a new matrix report of operating costs and traffic statistics by equipment type. The basis of the report was Form 41 data. When can we add this report to the info system? I would be happy to inspect the r	Closed
105	Add a standard list of terms to the FAQ page.	Closed
106	Add the user's guide to on-line help.	Closed
107	Reports available from ftp are in the /pubs directory (non-secure). Move the reports to an area within the secure web pages.	Rejected

Table E-1. QRS Problem Report Description and Status (Con't.)

PR Number	Problem Description	Status
108	Spell out QRS on the initial ASAC Home Page. Last three bullets: Quick Response System (QRS) Database Queries Quick Response System (QRS) Report Server (now available!!) ASAC Air Carrier Investment Model	Closed
109	Create an archive for the data we are pulling for Draper Labs (as well as for future data requests). Others may request the same data.	Closed
110	Add data source descriptions to the help section.	Closed
111	Because of nuances in ASQP reporting, various (some but not all) data fields for cancelled and diverted flights contain zeroes. I'm not sure how we handled these exceptions. Ideally, we would have selectively replaced 0000 with NULL so that cancelled an	Closed
112	While loading the ASAC Home Page and jumping to the QRS Report Server before the Home Page had finished loading, we crashed the PC and UNIX versions of Netscape on Bill Hooker's machines. Please investigate.	Closed
113	Add a Word version of the user's guide to the download users guide list. Update the user's guide to reflect change.	Closed
114	Changes to column headings. (Report ID: COD-EQ1)	Closed
115	Changes to Definition of Key Terms - Aircraft hours - swap aircraft and airborne Add DOC and VOC definitions	Closed
116	Add text to new user web page stating that the application should be used for new users only -- people with id who want something changed should use e-mail via feedback link.	Closed
117	New user email messages should have some sort of subject field added. Something like "ASAC QRS new user request".	Closed
118	The User's Guide needs an explanation of how the Remainder row works. Reports that would contain a large number of rows contain the first 2,000 rows of the report, followed by a Remainder row, which sums up the remaining rows, etc... (Report ID: USER GUI	Closed
119	Printed columns not wide enough in some instances (Report ID: OAG-AP2)	Closed
120	Link sources on report request pages to data source description page.	Closed
121	Link column headings on report request pages to definition of key terms page.	Closed
122	Add Report Server help information to the User's Guide (key terms, source definitions, FAQs, etc.)	Closed

Table E-1. QRS Problem Report Description and Status (Con't.)

PR Number	Problem Description	Status
123	Rentals has been left out of operating costs reports. We need to add column to report for Rentals, and include in total column. (Report ID: G23OC G1OC)	Closed
124	Update footer graphics on all html pages	Closed
125	Need form to allow QRS users to change their password	Closed
126	"Total Operations" is used in TAF reports, but it's definition differs from its use in OAG reports. I suggest renaming the column in the TAF reports to "TAF Total Operations". (Report ID: TAF1,2,3)	Rejected
127	Make help links information in lookup-table file.	Closed
128	Extend validation rules to encompass all database 'code' elements.	Closed
129	In Jet Engine Data, change the first report title from "Distribution of Aircraft Mounting a Specific Engine" to "Distribution of Aircraft Powered by a Specific Engine" (Report ID: AI7)	Closed
130	Create a table that rolls TAF, OAG, and DOT airport names into airports, cities.	Resolved
131	Proper capitalization of OAG airports is required.	Closed
132	Change Equipment Type to Aircraft Type in report COD-EQ1. Also change Departures Performed to Flight Count. (Report ID: COD-EQ1)	Closed
133	Please change column titles and variable listings from "Flight Count" to "OAG Departures" for the following reports: OAG-AP1, OAG-AP2, OAG-AIR3, OAG-AIR4, OAG-AIR5. Thanks! (Report ID: Multiple)	Closed
134		Rejected
135	The link to the ASAC Air Carrier Investment Model is correctly named on the ASAC Home Page, but after I make the link to download the files it refers to the "LMI" model. Please change it to its new, officially sponsored name of the ASAC Air Carrier Invest	Closed
136	I inadvertently wrote over PR 1 when trying to create PR 135. Sorry.	Closed
137	Please change "Average Number of Seats per Aircraft" to "Average Seats". Thanks! (Report ID: OPRATCR1)	Closed
138	Please make two changes to report: "Number of Aircraft" to "Number of Operating Aircraft"; and "Seats per Aircraft" to "Average Seats". Thanks! (Report ID: COD-EQ1)	Closed
139	Please change "Expense of Discontinued Operations" to "Discontinued Operations, Extraordinary Items, Accounting Changes". I suspect this will require multiple lines for the column heading and some punctuation in the listing of data elements to make it cl	Closed

Table E-1. QRS Problem Report Description and Status (Con't.)

PR Number	Problem Description	Status
140	Report description page should separate column names with semi-colons and contain column names within <NOBR> tags so that they do not span lines.	Closed
141	Please change second title in report to "(sorted by aircraft type, equipment name)". Thanks! (Report ID: COD-EQ1)	Closed
142	Reports with '-' in name (e.g., OAG-FS1) do not get saved with the dash (i.e., the name is OAG.XXX.slk instead of OAG-FS1.XXX.slk)	Closed
143	The sixteenth column (P) is too small for the total. Please widen to accommodate. Thanks! (Report ID: COD-EQ1)	Closed
144	Change the column heading in the two referenced reports from "Commuter Enplanements" to "Commuter or Regional Enplanements" (Report ID: TAF-1,2)	Closed
145	change-passwd routine should enforce password lengths >= 6	Closed
146	New user applications should record the user's IP address from the environment instead of asking for the domain name. This will reduce the number of users having problems with this.	Closed
147	This is a general comment based on I think that we need to have the capability to create sub-divisions of various reports based upon regions or even countries of the world.	Future
148	I reversed the order of subtraction in the definitions of arrival and departure delay. The definitions should say that delay is the actual time minus the scheduled time. There are separate definitions for arrival delay and departure delay. Flight delay	Closed
149	The column heading "OAG Departures" is not linked to defkeyterm.html#Departure Performed. Other column headings have similar problems.	Closed
150	In the column heading "Number of Operating Aircraft", Operating is mispelled. Also, "Sched & Non-Sched Revenue Aircraft Miles" is not linked to defkeyterm.html#Aircraft Rev Miles Flown. (Report ID: COD-EQ1)	Closed
151	In the Boeing Jet Aircraft Inventory database, the two B737-300s with JT8D engines operated by Aer Lingus are actually B737-200Cs with JT8D engines. The DOT code for the B737-200C is 621. This error was pointed out to us by Pratt and Whitney during our	Closed
152	Increase width of column 5 (Report ID: AI7)	Closed
153	Help needed for ENGINE CODE data element	Closed
154	Feature request: add page that lists all of the reports by title and code	Closed
155	Please rename report to "Jet Engine Inventory". Low priority task as time permits. Thanks! (Report ID: AI5)	Closed

Table E-1. QRS Problem Report Description and Status (Con't.)

PR Number	Problem Description	Status
156	Please revise report AI4. The column headings from left to right should be: Carrier Name; Model Name; Series Name; Inventory Count; Engine Name; Engine Count. The first row should be labeled "Total" and include column totals for inventory count and engi	Closed
157	Please change second title to: (sorted by aircraft type, model name). Since we don't use the phrase "equipment name" anymore, could you do a global search on titles to see if we have any other inappropriate usages. Thanks! (Report ID: COD-EQ1)	Closed
158	Tom Galloway discovered a shortcoming in this report. Because the hidden columns are the extreme right, when Tom did a sort of the visible range, he didn't include these hidden data. Consequently, what were good calculations in the visible range became	Closed
159	Reports with carrier types S or O do not check for valid entry of S or O	Closed
160	Data fields for MONTH and DAY should be option buttons, not number text fields	Closed
161	Report AI-8 does not have help with model and series names. (Report ID: AI-8)	Closed
162	The title for the help function is wrong. INVENTORY.HTML presently says "ASAC Engine Codes". It should say "Inventory Model and Series Names". (Report ID: AI9)	Closed
164	Inventory Reports need to specify data year (Report ID: AI[1-9])	Closed
165	Report does not correctly handle wildcard for carrier (error returned to user). (Report ID: AI4)	Closed
166	Needs to produce option menu for Airline Inventory Data Years 1993 and 1995	Closed
167	Need to add variable for inventory data year (1993 or 1995). This relates to PR 166, but these changes need to be made in the report specs after PR 166 is resolved. (Report ID: AI[1-9])	Closed
168	Report should say "ranked by OAG Departures" instead of "flight count". (Report ID: OAG-AIR3)	Closed
169	In the report page, in the listing of column headings or report variables, there is an entry that says "hidden hidden share." I don't think these should be shown. (Report ID: OAG-FS2)	Closed
170	We have a discrepancy in the title of the inventory data. In one of the introductory pages that lists the data sources and report categories, we say "Worldwide Jet Inventory." Later, in the data source description, we say "World Jet Airplane Inventory."	Closed

Table E-1. QRS Problem Report Description and Status (Con't.)

PR Number	Problem Description	Status
171	For the Jet Inventory help facility, the title should be "World Jet Inventory Models and Series". Also the first sentence should read "The following model and series names are available in the World Jet Inventory". Finally, I recommend that we add the n	Closed
172	Airport codes for these reports should be on an option menu. (Report ID: oag-tm*)	Closed
173	Non-error conditions write to stderr, causing calling programs to think that an error has occurred and not delivering the report.	Closed
174	The report titles and writeups in /access/datadesc.html are no longer alphabetical.	Closed
175	Most Important Origin and Destination Airports ranked by revenue. Satisfies ASAC functionalities OD-1.2 and OD-2.2 (Report ID: OD-AP5)	Closed
176	Presently, the choice of year is limited to 89-93. Should be able to choose any year from 1987 to 2005. (Report ID: TAF-2)	Closed
177	Improve method by which variable names are converted to option menus. Create system where a text file may be used to specify report name, variable name, and option list contents. This will make the task of changing option lists and variable names easier	Closed
178	In the OAG aircraft table, there is some missing data for the following two aircraft: CVF = CONVAIR (freighter), GTOW = 55,000 and engines = 2; 37F = B377 STRATOCRUISER (freighter), GTOW = 145,800, engines = 4. For code 735 = B737-500, the GTOW should be	Closed
179	Create a new report for functionalities OAG-4 and OAG-6.2. In the report, for a specific airline, list the type of aircraft flown along with average stage length, block minutes, revenue passenger miles, etc. Also, for the airline, roll-up the equipment sp	Closed
181	Create new report corresponding to functionality OAG-5. For a given airline, summarize airport-specific data and give totals for the whole airline (Report ID: OAG-CA4)	Closed
182	Fix two problems with sp. carrier selection with this report: (1) Cannot specify both OAG and DOT codes - program crash occurs. (2) Do not get appropriate selection on carrier when OAG code for carrier is entered. All carriers appear in the report. DOT co	Closed
183	Create new report for ASAC functionality OD-1.3: Most Important Origin Cities by number of passengers	Closed
184	Create new report for ASAC functionality OD-1.4: Most Important Origin Cities ranked by revenues	Closed
185	Create New Report for ASAC functionality OD-2.3: Most important destination cities by # of passengers	Closed

Table E-1. QRS Problem Report Description and Status (Con't.)

PR Number	Problem Description	Status
186	Create New Report for ASAC functionality OD-2.4: Most important destination cities by revenues	Closed
187	Create New Report for ASAC functionality OD-3.3: Most heavily travelled city pairs ranked by # of passengers	Opened
188	Create New Report for ASAC functionality OD-3.4: Most heavily travelled city pairs by revenues	Opened
189	Create New Report for ASAC functionality OD-4.2x(additional capability): Most heavily travelled city pairs sorted by (i) circuity factor, (ii) traditional yield, (iii) zero fare passengers ascending, (iv) zero fare passengers descending, (v)average fare	Opened
190	ASAC Functionality TAF-2 requires that we provide a list of identifiers of all airports satisfying specified criteria. The report TAF-2 does provide a list, but doesn't give the user the ability to specify a criteria for selectiing the airport. (Report ID	Future
191	In the page called access/datadesc.html, "DOT Origin and Destination" should be second item under "DOT Form 41" heading	Closed
192	The second title for each of these two reports should say "(ranked by revenue passenger miles)" in lieu of "(sorted by …)". (Report ID: OAG-FS1/2)	Closed
193	The seventh column from the left (labeled Gross Takeoff Weight) is too narrow. Consequently, when the spreadsheet prints, the words are cut off. (Report ID: OAG-FS1)	Closed
194	Need to add a column to reflect the total of maintenance costs to this report. (Report ID: COD-EQ1)	Closed
195	Report source is 'World Jet Airplane Inventory', should be 'World Jet Inventory'. (No link to source information). Please check all 'World Jet Inventory' reports. (Report ID: AI3, AI5,)	Closed
196	SFO is out of order in the text portion of the page (SFO should be last in the list). Same for other reports that contain this list of airports. (Report ID: OAG-TMMG)	Closed
197	Change the report title to read 'OAG Equipment Level Data for a Specific Carrier'. (Report ID: OAG-CA3)	Closed
198	Change row 'Totals' to 'Total' to be consistent with other QRS reports. (Report ID: OAG-CA3)	Closed
199	Low and high seats for OAG aircraft code "100" (the Fokker 100) should be 97 and 109, respectively.	Closed
200	In COD-EQ1, the gallons of fuel burned per 1,000 ASMs flown is off by a factor of one thousand. This is a very important symptom of a larger problem; please fix ASAP! (Report ID: COD-EQ1)	Closed
201	Update OAG_AIRCRAFT_MODEL to reflect new values for GTOW and aircraft obsolesence.	Closed

Table E-1. QRS Problem Report Description and Status (Con't.)

PR Number	Problem Description	Status
202	Data source descriptions and key term definitions need to be synched with appendices in User's Manual.	Opened
203	In the QRS welcome page the word "to" is missing between the words "capability" and "access".	Closed
204	Both Ed and Pete would like "LMI" to be added to the ASAC Home Page Graphic.	Closed
205	The hypertext link to the Langley site is incomplete. It should be "www.larc.nasa.gov/larc.cgi". The current link doesn't give you all of the options.	Closed
206	The script that handles new user requests misbehaves if the applicant puts in middle intitial or a second name in the First name box.	Closed
207	Under ASAC Related Web Sites, Aviation-Related, please add the AIA home page (www.access.digex.net/~aia/) and the ATA home page (www.air-transport.org/).	Closed
208	Create new report which predicts departures for 2005 and 2015 for specfic equipment for a given airport. (Report ID: OAG-AP3)	Closed
209	Find and fix all scaling and data inconsistency errors for 1994 data in the Report Server	Closed
210	Document the process of data transfer from the PC to the UNIX server. Include all post-processing that is done to the data on UNIX.	Opened
211	Origin and Destination data for 1990 to 1994 have been revised. Upon receipt of the 1995 CD, we will have to repull and reprocess the prior years' data.	Future
212	For DOT equipment code 468, the manufacturer should be British Aerospace. For DOT equipment code 664, the manufacturer should be Messerschmitt.	Closed
213	Add a document server to ASAC. Will contain LMI ASAC related reports.	New
214	OAG carrier code SK should be Scandinavian Airlines System (SAS).	Closed
215	Please add the Federal Aviation Administration's Web Site as an aviation-related site on the ASAC Home Page. Address is: http://www.faa.gov.	Closed
216	Fix OAG-AP3 so that users are warned to use a specific airport codes(demostic only). Mandate that users enter an OAG Airport Code. (Report ID: OAG-AP3)	Closed
217	Fix OAG-AP1 and OAG-AP2 such that the user is mandated to enter an airport code in order to run the report	Closed
218	Please add a new Aviation-Related Site-- "AirNav: Airport Information". The address is: http://www.cc.gatech.edu/db1/fly/airport-info.html.	Closed

Table E-1. QRS Problem Report Description and Status (Con't.)

PR Number	Problem Description	Status
219	Inspection by Insure++ tool exposed some various memory leaks and errors, including 2 potentially serious ones.	Closed
220	Fix OAG-AP3 so it uses the table AIRPORT in the QRS database to cross-reference between OAG and TAF airport codes. (Report ID: OAG-AP3)	New
221	Add the following link to the list of related sites: aee.hq.faa.gov	Closed
222	Please add Regional Airlines Association to the listing of Aviation Related Sites. The address is: http://www.raa.org.	Closed
223	Add link to oag-ap3.html in description section of report request page for OAG-AP3. (Report ID: OAG-AP3)	Closed
224	Please move "Preliminary Benefit Analyses of Selected AST Programs" (ast-pba.html) and all its associated spreadsheet files to behind the QRS's userid and password protection.	Closed
225	Please add the related site that Paul found, I.e. www.nasao.org/5010/5010_search.html. It complements the GA Tech site.	Closed
226	Under aviation related sites, the Office of Environment and Energy should be called the FAA Office of Environment and Energy.	Closed

227	Add Aviation-related web sites:
	//web.mit.edu/16.00/www/labs/aatt/aatt.html
	//web.mit.edu/16.00/www/labs/ftl/ftl.html
	www.caasd.org
		Closed

228	When using MS Internet Explorer, I had to give the network password (provide authentication info) to go to the report categories and to download a report. These steps do not occur when using Netscape. Are they intended?	Rejected
229	In the Query Server, the function called Airport Rundown should list total operations (sum of the six types of ops) as a time series, rather than the current two columns of enplanements.	Future
230	Using MS Internet Explorer, the box for spreadsheet type (PC/MAC Excel or UNIX Viewer) is truncated (too narrow).	Rejected
231	Now that we have the new TAF, this report should use the most recent data. Also, it should use the growth rate from 2005 to 2010 to project 2015 departures. (Report ID: OAG-AP3)	Closed
232	Eric Gaier found some errors in the 1994 B43 data. About 5% of the entries in "year of first delivery--airframe" are wrong. He will estimate the correct data and we will have to reload. Similar errors exist in the 1995 data also.	Closed

Table E-1. QRS Problem Report Description and Status (Con't.)

PR Number	Problem Description	Status
233	The ASAC query server has a typo: Transportation is spelled Transporation throughout.	Closed
234	Divide by zero error OAG DEPARTURE AIRPORT CODE=ORD (Report ID: OAG-AP3)	Closed
235	Source code for SQL in report specification is not well documented or organized. Needs extensive commentary and useful table and variable names, as well as clearer formatting. (Report ID: OAG-AP3)	New
236	Should have zero decimal places in block minutes per flight in the row entries (so that it is the same as OAG-EQ1). (Report ID: OAG-EQ2)	Closed
237	Column G (7th from the left) in all three reports should be resized to 11. Otherwise, the total doesn't show (too wide). (Report ID: ASQP-AR1-3)	Closed
238	You get two rows for most airports (one for 1993 ASQP data and the other for 1995 ASQP data). Since we don't have the 1995 T-3 data, the report should only compare the 1993 ASQP data with the 1993 T-3 data. (Report ID: ASQP-RAT)	Closed
239	The aircraft types are wrong (shows propeller for all). (Report ID: OAG-AP1)	Closed
240	The aircraft types are wrong (shows propeller for all). (Report ID: OAG-FS1)	Closed
241	Delete supplemental enplanements as a column and in the total enplanement calculation. Also, should require that a TAF airport code be entered. (Report ID: TAF-1)	Closed
242	Delete supplemental enplanements as a column and in the total enplanement calculation. Also, expand the choice of years to 1976 to 2010. (Report ID: TAF-2)	Closed
243	In the variable definitions, for air carrier enplanements we should delete the word "scheduled" between "on" and "flights" in the first sentence. The definition for supplemental enplanements should be deleted. In the definition of total enplanements, we	New
244	Divide by zero error. (Report ID: OD-AP1)	Closed
245	Add link to FAA Noise Certification Data to QRS Home Page; add pages to server	Closed
246	Expand the choice of years to 1976 to 2010. (Report ID: TAF-2)	Closed
247	Please delete "1993" in Source for the following TAF-related reports: OAG-AP3, TAF-1, TAF-2, TAF-3, and TAF-COD1.	Resolved
248	COD-EQ1 on UHURA no longer has a column for maintenance costs. See PR Number 194. (Report ID: COD-EQ1)	Closed
249	For the B43-CA1 and B43-EQ1 report, the instruction should say you must enter "a" (not an) DOT … (Report ID: B43-***)	Resolved

Table E-1. QRS Problem Report Description and Status (Con't.)

PR Number	Problem Description	Status
250	Need to update the TAF source description to reflect the new data.	Resolved
251	Need two versions of the ASQP airport level reports (ASQP-AR1,2,and 3); one for 1993 and one for 1995. For the 1995 version, add four columns: Taxi-out Time (Minutes), AverageTaxi-Out Time (Minutes), Taxi-In Time (Minutes), Average Taxi-In Time (Minutes)	Resolved
252	For all the ASQP airport and flight segment reports, add Year as a data element. Choice is either 1993 or 1995. In report header, source of data should delete "1993". Data source description should say that we have two years, and that only 1995 has tax	Resolved
253	In the OAG Aircraft Model table, seats are too high for some models. For code 762 (B767-200/200ER), seat low = 180 and seat high = 250. For code 767 (B767-all), seat low = 200 and seat high = 270.	Verified
254	The 1994 B43 Data needs to be corrected. Eight serial numbers have incorrect DOT equipment codes. Four of those also have an incorrect AC-type, which I found by double-checking the hard copy. (These errors were found when I was processing the 1995 data an	Verified
255	Not all recently added definitions (e.g. taxi-out time, taxi-in time, etc.) are available at access/help/AppendixB.htm. Please point all definition links to most comprehensive and up-to-date file.	New
256	B43 data source writeup does not show up at access/help/AppendixA/htm. Please point all data source links to most comprehensive and up-to-date file.	New
257	Netscape crashed when I was doing the demo at NASA Langley. Problem was Java and the banner at the botton of ASAC Home Page. Apparently a buffer filled up.	Verified
258	Please move definition listed under "Stage 2" to a more general "Noise Stage" listing and then delete "Stage 2" from definitions of key terms. Report variables Stage 2 and Stage 3 should be pointed to the "Noise Stage" definition.	New
259	Please update methodology write-up. I'll leave a marked-up copy with Jim. (Report ID: OAG-AP3)	New
260	Numeric fields that begin with a decimal point generate a text format warning (Report ID: ODCT-RV)	Verified
261	insight tool reports buffer read overrun error (Report ID: BS1)	Verified
262	insight tool reports bad array index in iFileMerge() (Report ID: BS1)	Verified

Appendix F
Glossary

ANSI	American National Standard Institute
ASAC	Aviation System Analysis Capability
COTS	Commercial-off-the-shelf
CSU/DSU	Channel Service Unit/Data Service Unit—that converts data line signals to data understandable to a router.
DOT	U.S. Department of Transportation
FTP	File Transfer Protocol
GB	Gigabyte
GUI	Graphical User Interface
HTML	Hypertext Mark-up Language
HP	Hewlett-Packard
HP-UX	HP's version of UNIX
HTTP	Hypertext transfer protocol
HTTPD	Hypertext transfer protocol daemon
IP	Internet Protocol
IRIX	Silicon Graphics' version of UNIX
LAN	Local Area Network
LMI	Logistics Management Institute
MB	Megabyte
Motif	The standard GUI and window manager from OSF, running on the X Window System.
NASA	National Aeronautics and Space Administration
NCSA	National Center for Supercomputing Applications
OAG	Official Airlines Guide
OSF	Open Software Foundation

PR	Problem Report
QRS	Quick Response System
RAM	Random Access Memory
RDBMS	Rational Database Management System
RISC	Reduced Instruction Set Computer
SCSI	Small Computer Systems Interface—A processor-independent standard for system-level interfacing between a computer and intelligent devices including hard disks, floppy disks, CD-ROM, printers, and scanners.
SQL	Structured Query Language
SunOS	Sun's version of UNIX
TAF	Terminal Area Forecast
TCP/IP	Transmission Control Protocol/Internet Protocol
UNIX	An interactive time-sharing operating system.
UPS	Uninterruptable Power Supply
WAN	Wide Area Network
WWW	World Wide Web
X.25	A standard developed to described how data passes into and out of public data communication networks.
X Window System	A defacto standard for device-independent windowing operations used on many UNIX systems.

REPORT DOCUMENTATION PAGE

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This document is the *Aviation System Analysis Capability (ASAC) Quick Response System (QRS) Test Report*. The purpose of this document is to present the results of the QRS unit and system tests in support the ASAC QRS development effort.
This document contains an overview of the project background and scope, defines the QRS system and presents the additions made to the QRS this year, explains the assumptions, constraints, and approach used to conduct QRS Unit and System Testing, and presents the schedule used to perform QRS Testing. The document also presents an overview of the Logistics Management Institute (LMI) Test Facility and testing environment, and summarizes the QRS Unit and System Test effort and results.

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