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International Aircraft Operator Data Base Master Requirements and Implementation Plan

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National Institute for Aviation Research
The Wichita State University

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Final Report

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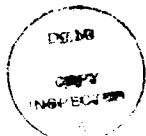
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16. Abstract

   This International Aircraft Operator Data Base Master Requirements and Inplementation Plan describes the Federal Aviation Administration's requirements for aircraft operator information as well as a plan for addressing these requirements.
   This study has shown that in order to carry out this responsibility the FAA requirements include a unique description of each aircraft along with the name, address, telephone number, and fax number of the aircraft operator. It has also been determined that the FAA has other ad hoc requirements for aircraft operator related information.
   As a result of investigations during the first phase of this effort, it has been determined that information needed by the FAA to carry out this responsibility is available through the private sector. In addition, much of the software and computer networking capability necessary to make effective use of this information is part of the Department of Transportation's Office Automation Technology and Services (OATS) environment being developed under contract for the FAA by American Telephone and Telegraph (AT&T).
   The primary task of this program is to create an information system which will facilitate and enhance communication between the FAA and the aircraft operator data suppliers. In addition to the description of the FAA requirements, this document contains a plan to make use of these commercial data suppliers to create an aircraft operator information system.

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EXECUTIVE SUMMARY

This International Aircraft Operator Data Base *Master Requirements and Implementation Plan* defines the Federal Aviation Administration's requirements for aircraft operator information and presents a plan for addressing them. These requirements stem from the FAA's demonstrated need to distribute airworthiness safety information to the actual operators of aircraft. The major complicating factor regarding the distribution of this information is the fact that the United States Civil Aircraft Registry, which is used to distribute airworthiness safety information, correctly records only the legal owner of the aircraft, which may or may not be the operator.

This Research has shown that in order to carry out this responsibility, the FAA must have a unique description of each aircraft along with the name, address, telephone number, and fax number of the aircraft operator. It has also been determined that the FAA has other requirements for ad hoc reports on aircraft operator related information and that these needs can be met with minor additions to the data necessary to meet the primary FAA operator data requirements.

Studies to date indicate that most of the FAA's requirements for aircraft operator data can be met by creating an information system which makes use of commercially available aircraft data. Additionally, this document contains a plan to make use of these commercial data to create an aircraft operator information system. During Phase II of this program a prototype aircraft operator information system will be developed and operated for the FAA. At the end of this period a fully documented, operational aircraft operator information system will be delivered to the FAA.

The plan for the hardware and software system is fully compatible with the Department of Transportation's Office Automation Technology and Services (OATS) environment (see reference 1). The hardware will be the AT&T Model 6386/33 Model S client/server system with the Starlan networking configuration. This system is highly modularized and will permit enhancements of performance by incremental additions. The software will be prepared in the UNIX environment using Oracle. Oracle is a powerful relational data base management system which offers a complete implementation of SQL, the industry standard relational data base language. Oracle runs without modifications on most computers. Using Oracle will permit order of magnitude increases in performance without major new software development.

INTRODUCTION

PURPOSE.

The purpose of this program is to deliver an automated information system to the Federal Aviation Administration (FAA) which will provide useful aircraft operator information on all United States Type Certificated aircraft. The final product will be a system that is periodically updated and accessible to other governmental agencies.

BACKGROUND.

The FAA has a continuing need to distribute timely airworthiness safety information to the operators and owners of aircraft with a United States Type Certificate. Timely notification of maintenance and repair issues and required modifications are basic tenets of our eminence as a world leader in aviation safety. The FAA's Aviation Standards National Field Office (AVN) carries out this responsibility by reference to a U.S. civil aircraft registration list and several air carrier listings. These lists are not all-inclusive and require laborious and time consuming manual crosschecking. Thus a considerable degree of inefficiency is inherent in the current manual processing system. A major complicating factor regarding the timely distribution of airworthiness information is the fact that the U.S. Civil Aircraft Registry correctly records only the legal owner of the aircraft, which may or may not be the operator. The registered owner of turbine powered and large piston powered aircraft is often a financial institution. Further, subleasing practices often result in numerous operators of a single aircraft. The current operator, therefore, may not receive important airworthiness information. The methods presently employed by the FAA to ensure proper notification of airworthiness information are not adequate to meet demands for current aircraft operator data.

In addition to the distribution of airworthiness information, the FAA also has other needs for aircraft operator data. These data are needed in a wide variety of situations which include routine inquiries, inquiries directed to the Law Enforcement Assistance Unit (LEAU), and inquiries concerning aircraft accidents.

As a result of investigations in this first phase of this effort, it has been determined that information needed by the FAA to carry out this responsibility is available through the private sector. In addition, a great deal of the software and computer networking capability necessary to make effective use of these data bases is a part of the Office Automation Technology and Services (OATS) environment being developed under contract for the FAA by American Telephone and Telegraph (AT&T). The primary task of this program is to create an information system which will facilitate and enhance the communication between the FAA and aircraft operator data suppliers.

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This program (see reference 2) began with a 10 month effort (Phase I) in which an evaluation of existing international aircraft operator data was completed and the present *Master Requirements and Implementation Plan* was developed. Also included in Phase I was a feasibility demonstration in which a private sector data supplier provided aircraft operator data to selected FAA offices by means of a telephone call-in service. An examination of the logs of these calls also contributed to the determination of the true needs of the FAA for aircraft operator data. Phase II will consist of the development of a prototype aircraft operator information system. This system will then undergo extensive testing and operation. At the end of Phase II of this program an operational system and its resulting specifications will be delivered to the FAA.

DATA EVALUATION.

An extensive search was conducted to locate private companies that maintain data bases of aircraft operator information. This search consisted of telephone calls, referrals, a request for proposal, and an advertisement in the *Commerce Business Daily*. After careful evaluation, three data suppliers were awarded contracts to provide data for a more detailed study: Lundkvist Aviation Research, Forecast International and Bucher Publications (see reference 3). Contracts were signed with these companies to provide data. The data provided by these companies were evaluated for content and format. This was done by a careful analysis of the electronic data available from each of these data suppliers for selected aircraft models. Aviation Data Services was selected for the feasibility demonstration and was evaluated by an examination of the logs supplied in the Phase I feasibility demonstration.

All data suppliers have some characteristics in common that relate to their ability to effectively and economically provide data for use by the FAA and other government agencies. Most of the data suppliers are small businesses. Their data collection is usually centralized around an individual and, therefore, is consistent within itself. The data suppliers find that they are most effective when they cover a segment of the universe of aircraft types thoroughly with continuous updates to their data. They maintain low operating costs by calling on individuals in other locations, who provide specific information on a part-time basis. Each data supplier that was examined took pride in his accomplishments and had personal satisfaction in what he was doing.

> *As a result of this investigation, no single data supplier has been found with all of the data necessary to provide the coverage required by the FAA.*

Each has developed a data base that fits the criteria of what was practically possible and economically rewarding for his purposes. The work involved in finding and recording the data is labor

intensive and usually depends on the skills and knowledge of a single person. This limits the size of the data base that a company can effectively maintain.

> *The Phase I data suppliers provide good coverage of the larger airplanes and rotorcraft but little or no electronic coverage of piston-powered single and multi-engine, noncommercial, under 3,000 pound, aircraft.*

Manufacturers of selected aircraft were contacted to determine the quantity and serial number range of aircraft that have been delivered. A master list was created from this information. A listing of current aircraft by model was compiled from the data provided by the data suppliers. The serial numbers and operator names for each aircraft were compared to the master list. Data obtained from Lundkvist Aviation Research contained a sequence of historical data for each aircraft. The historical sequence of each specific aircraft was represented by multiple records. That is, each time an aircraft changed status a new record was created. A single most current record was required to assess the comparative completeness for each serial number. A program was written to select only the most current information for each aircraft. Aircraft from each data supplier were compared to the master list and to each other in order to test the completeness of the data bases. The data evaluation was also supplemented by visits to the facilities of each data supplier and a close examination of the logs kept by the operator of the feasibility demonstration.

It has been determined that Lundkvist Aviation Research has the best coverage (completeness) of aircraft and excellent aircraft histories, but no operator addresses or telephone numbers. Lundkvist Aviation Research has records for all air carrier and corporate aircraft. They had no information on general aviation airplanes or rotorcraft.

Bucher Publications has the best coverage of commercial, government, and corporate aircraft with a gross weight over 3,000 pounds worldwide, but contained no coverage of other aircraft. Their coverage includes complete names, addresses, and telephone numbers of the aircraft operators.

Forecast International has the most sophisticated management information system of hardware, software, and communications. They also have considerable experience in supplying aircraft data. Their data base is designed to provide the names and addresses of all operators of a specific type of aircraft or aircraft engine. The connection of a specific operator with a specific aircraft was incomplete during the evaluations carried out in Phase I. As a result they had less coverage of some of the active aircraft examined. They have no information on small general aviation aircraft.

As a result of the feasibility study in Phase I some information has already been obtained about the quality and quantity of the data supplied by Aviation Data Services. This information appears to be accurate and complete. A complete evaluation of all of the above data suppliers will be included in the report on the evaluation of existing data sources.

REQUIREMENTS

POTENTIAL USERS AND THEIR REQUIREMENTS.

Data and system requirements have been developed based on the requirements of FAA offices and other users. Conferences were held with Federal Aviation Administration personnel at the FAA Mike Monroney Aeronautical Center in Oklahoma City, OK, the FAA Headquarters in Washington, D.C., and the FAA Europe, Africa, and Middle East Office in Brussels, Belgium, to identify all potential FAA and other users of the operator data base. Follow-up telephone calls to these offices were made during Phase I. The FAA Manufacturing and Engineering Branch in Oklahoma City (AVN-110) helped establish the specifications for the required data by delineating their requirements for aircraft operator data. Among their needs was an accurate, current listing of addresses of aircraft operators that would reduce the number of undelivered regular and priority letters with aviation safety information. Further, they require the capability to meet short deadlines for delivery of emergency telegraphic messages. Representatives from the Law Enforcement Assistance Unit (LEAU) also participated in these meetings and expressed a need to have owner and operator information available for their use. This unit has the responsibility of providing law enforcement agencies with aircraft information.

A meeting was held at the FAA Headquarters, in attendance were representatives of the FAA's Office of Accident Investigation, Operations Center, Aircraft Certification Service, Flight Standards Service, Flight Standards Aircraft Maintenance Division, International Technical Office, and Office of Civil Aviation Security. Flight Standards expressed an interest in having more complete information on general aviation aircraft, including the types of engines installed. A representative of the Aircraft Certification Service expressed a need to reduce or eliminate hand sorting of the owners and operators addresses to delete duplicates. The requirements which were related to aircraft operator names, addresses. and telephone numbers were within the capabilities of the proposed information system. Other needs were expressed for aircraft configuration information, equipment lists, and airworthiness information that were beyond the scope of the present program.

Discussions were held with representatives of the FAA's Office in Brussels, Belgium concerning their requirements. This office is often faced with the problem of locating operators and owners of United States registered aircraft operating in foreign countries. These operators, however, are not required to inform the FAA of their whereabouts. They expressed a need to have a system that would provide them access to aircraft operator information during their hours of operation, which are not consistent with U.S. hours.

hey also described the lit. '...tions placed on interactive computer communications with the United States. These limitations were imposed by the poor capabilities of foreign telephone systems.

pproximately 200 FAA Offices and field offices, including nternational offices, were invited to participate in the easibility demonstration. Included in this demonstration were 'light Standards District Offices (FSDOs) and Manufacturing and nspection District Offices (MIDOs). Aviation Data Services rovided the feasibility demonstration by using its files to espond to FAA inquiries. A log was kept of these inquiries. This og has been examined and analyzed to provide further descriptions f FAA needs for aircraft operator data. Requirements determine y this activity are included in the following description of data equirements.

AA AIRCRAFT OPERATOR INFORMATION REQUIREMENTS.

he principal FAA requirement to which this effort is addressed is he need to provide names, addresses, and telephone numbers (and ax numbers) of aircraft operators for the timely distribution of irworthiness safety information. This need, as anticipated in the riginal request for proposal, has been reinforced during the ourse of this effort.

onversations with FAA personnel and inquiries received during the easibility demonstration indicate the need for aircraft data for variety of circumstances other than the distribution of irworthiness safety information. These circumstances are ypically ad hoc requests. Some of these other data requests fall utside of the scope of this contract or require data which is not vailable, while others could easily be met with modest odifications or additions to the system. Examples of these other ypes of requests, which can be answered by the proposed system, re as follows:

1. Requests for operator and owner information for a specific aircraft by model and registration number.

2. Requests for registration number, operator address, and owner address for all U.S. registered aircraft of a single model.

3. Requests for names of aircraft owners and status of aircraft models of a specific type and serial numbers.

4. Requests for registration number, manufacturer and model, operator, operator address, owner, and owner address for all U.S. registered aircraft in a foreign country.

5. Requests for registration number, model, serial number, operator name and address, owner name and address for all U.S. registered aircraft of a given type operating in a region.

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6. Requests for the model and operator of aircraft fitted with particular engines.

7. Requests for owner and operator historical information for a specific model and registration number.

Requirement number seven for historical information goes beyond the original scope of this program. However, it has been found that there is a significant FAA need for this information and it is available at little extra cost. It could also be included in the system without undue difficulty and its inclusion is therefore recommended.

MODE OF DATA PRESENTATION.

A requirement exists for the aircraft operator information to be presented in three formats: on a computer screen, in printed form, and as Cheshire address labels. Because of the limitations of the telephone systems outside of the United States, it will be too time consuming to submit interactive requests to the system from abroad. As a result it will be necessary to create screens and generate scripts which will submit batch requests with responses returned by electronic mail.

Because the ability to supply mailing addresses (or electronic mailing addresses) is an important requirement of the system it is essential that a capability be developed to remove duplicate entries. For instance, if an airline operated fifty aircraft of a given type it should not be necessary send fifty identical airworthiness directives to that airline.

INFORMATION REQUIREMENTS.

The following list represents the important elements of the record for each individual aircraft which makes up the information system. It considers both the needs of the FAA and the availability of private and government data. Whenever possible these data will conform to the Federal Information Processing Standards (FIPS) format (see reference 4) and Aircraft Identification Codes (see reference 5).

Vendor Information
    Vendor Identification
Aircraft information
    Aircraft manufacturer and model
    Aircraft serial number
    Aircraft registration number
    Engine manufacturer
    Engine type
    Aircraft manufacturer's line number or series number
    Date of acquisition by each operator

```
Operator information
     Operator's name
     Operators address
     Operator's telephone number
     Operator's Fax number
     Operator Telex number
     Mode of operation (owned,...,leased)
Owner information
     Owner's name
     Owner's address
     Owner's telephone number
     Owner's Fax number
     Owner Telex number
Other information (for history suppliers only)
     Sequence code (for example:  1=ordered,....,95=current)
     Activity (for example:  1=active,...,9=crashed)
```

The primary mode of identification of a particular aircraft will
be the combination of manufacturer, model, and serial number. The
series number (line number) will be used to test for completeness
and identify blocks of aircraft where the serial numbers are not
consecutive.

When locating the operator under conditions of multiple leasing
agreements, it is important to locate the operator at the lowest
tier. A basic function of the information system is expected to
be the ability to notify the operator through the mail. An
accurate street address, city, state, country, and zip code is
needed. Since this is an international information system it is
essential that the address field be suitable for non-U.S.
mailings.

It has been found that not all data suppliers will be able to
supply historical data in electronic form, but at least one
supplier (Lundkvist) has considerable historical data that has been
found to be very useful. In order to make use of this data it is
necessary to have at least two status codes. The first of the
codes (sequence code) is set to 1 when an aircraft is ordered. The
code is changed sequentially with each change of status of the
aircraft. The code 95 is used to indicate the latest (most
current) entry for a aircraft. The activity code indicates the
current status of an aircraft. Detailed specifications for the data
are supplied in the implementation section.

In addition to identification of the data fields, methodologies
will have to be developed with the data suppliers to convert their
field definitions into a set of common field definitions.

AIRWORTHINESS SAFETY INFORMATION.

Because a primary purpose of the International Aircraft Operators
Information System is to facilitate the notification of owners and

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operators of aircraft of the existence of airworthiness safety information, a brief summary of the airworthiness directive procedure has been included in Appendix C. This will facilitate an understanding of where the proposed data base system will fit into this important procedure.

Procedures and guidelines for notification through the use of Airworthiness Directives (ADs) are well established. Reference 6 describes the policy and procedures for preparation and issuance of ADs by the aircraft certification directorates. Appendix C provides a brief description of the AD distribution process.

IMPLEMENTATION OF PROTOTYPE

An important step in the establishment of the final operational system is the creation and operation of a prototype aircraft operator information system. This effort constitutes Phase II of the program and will take place over a period of 23 months. The steps in this development are as follows:

1. Data Development

    a. Establish final data requirements.
    b. Advertise for Phase II data suppliers.
    c. Contract with Phase II data suppliers.

2. Prototype Development

    a. Design data interface.
    b. Design information system.
    c. Write and validate software.
    * d. Demonstrate prototype system.

3. Prototype System Tests.

    a. Design system test using vendor updates and simulated queries.
    * b. Test prototype system.

4. System Operability

    a. Operate prototype system for at least 10 months.
    b. Record and correct problems encountered.

5. Operational System

    a. Prepare users manuals.
    b. Demonstrate operational system, where operated, etc.
    * c. Deliver system, final reports, operational recommendations, and manuals.
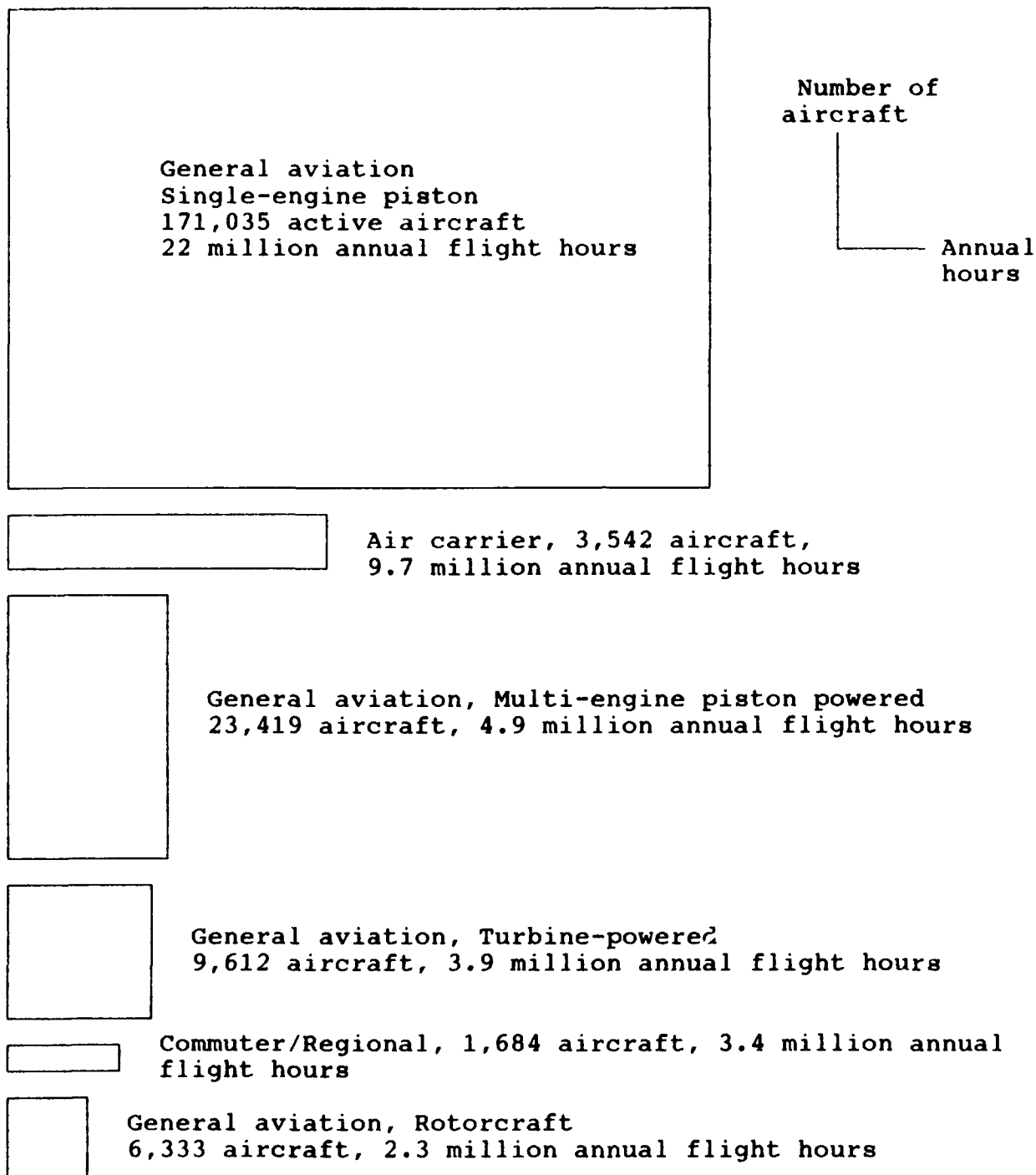
* = deliverables to the FAA

DATA DEVELOPMENT.

Data development is the most crucial element of this effort. Without good data even the best hardware and software will be of no use. In addition to locating good sources of data, a critical element in this program will be to cooperate with the data suppliers in the development of keys for each aircraft. Each record in the data base must contain certain data fields (keys) which uniquely define a particular aircraft. As might be expected, each of the current data suppliers, as well as the registry in Oklahoma City, has a different key which defines a particular airframe. The data suppliers will not be required to change their key definitions to conform to the requirements of this program. They will be required, however, to provide the information needed to convert their keys into a common key. This common key should conform as closely as possible to the keys used in the registry.

EXISTING DATA. As a result of the research performed during the first phase, a number of sources have been found which provide operator and owner information from within the private sector. For those aircraft for which good data already exist, data development will consist of working with existing suppliers to encourage them to expand their coverage as well as to stimulate additional suppliers by periodically seeking bids for data. This methodology will be employed during development and operation of the prototype information system.

SCOPE OF AIRCRAFT INFORMATION. The universe of active U.S. registered aircraft and their relative activity level is shown in Figure 1. The total active aircraft and flight hours were obtained from the FAA's *Census of U.S. Aircraft* (reference 7).

A large part of the fleet are aircraft certified under Part 23 of the Federal Aviation Regulations (see reference 8). These are aircraft with a gross weight of 12,500 pounds or less. Piston-powered aircraft make up the largest segment of the civil fleet. The Engineering and Manufacturing Branch issued 130 separate ADs against this category of aircraft in 1989. This is nearly half of all ADs issued. Each AD affected from 500 to 1,000 individual aircraft.

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General aviation
Single-engine piston
171,035 active aircraft
22 million annual flight hours

Number of
aircraft

Annual
hours

Air carrier, 3,542 aircraft,
9.7 million annual flight hours

General aviation, Multi-engine piston powered
23,419 aircraft, 4.9 million annual flight hours

General aviation, Turbine-powered
9,612 aircraft, 3.9 million annual flight hours

Commuter/Regional, 1,684 aircraft, 3.4 million annual
flight hours

General aviation, Rotorcraft
6,333 aircraft, 2.3 million annual flight hours

FIGURE 1 - RELATIVE FLEET SIZE OF
U.S. REGISTERED AIRCRAFT (1988 Data)

Air carrier aircraft comprise only about 7 percent of the active fleet of U.S. registered aircraft. As opposed to information available for large piston-powered and single-engine light aircraft, there are extensive sources of data available for this relatively small portion of the universe. Operators of these aircraft are more visible. Many are commercial operators and larger corporations. The turbine-powered aircraft have a greater market potential in terms of their individual value and their capacity to operate efficiently over longer range. There are more reporting requirements. Finally, this segment of the universe of aircraft is more changeable, with as many as 15 percent of the operators changing in a given year.

Research into potential data suppliers for operators of small, general aviation aircraft in electronic form has not been fruitful. There is less information available for this group of aircraft. There are several reasons for this, one of which is that the universe is large and there are no assurances that this group can be developed to any degree of completeness. In addition, the operators of this group are diverse and not easily located.

Special steps are recommended to develop the data base of small general aviation aircraft operators. Data integrity and completeness can be obtained by using the following program efforts:

1. Segmentation of these aircraft into categories and seeking completeness and accuracy for the aircraft data in each category. (ie: by manufacturer, by utilization, etc.)

2. Advertising for operator data and emphasizing those categories, such as piston-powered, single and twin-engined aircraft, for which data have not been found.

3. If it is not possible to locate good sources of operator data on these aircraft, the U.S. FAA aircraft registry data (or privately supplied registry data) for the missing aircraft (U.S. registered only) could be utilized.

KEY PREPARATION. The most important activity in this program is the establishment of keys which uniquely define each aircraft. For the FAA this key is a combination of a seven digit code and the aircraft serial number. The first three digits of the seven digit code give the aircraft manufacturer, the next two digits give the model, and the final two digits give the series. None of the data suppliers use the seven digit code, or even any common code.

It is essential that a common key be developed for the prototype information system. This key will have the FAA key included in it, or will be easily derived from it. A major task will be the preparation of software to convert the different data keys from the data suppliers to this common key and vice versa. A technique

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using FAA registry tapes has been developed at Wichita State University to do this.

OPERATOR ADDRESSES. In many cases where the name of the aircraft operator is known but the address and telephone is not, the International Air Transport Association (IATA) code is provided by the data supplier. This code permits a determination of the operators address and telephone numbers. These designator codes are both two and three letter codes. The two character code is in existence and applies to most operators worldwide. The International Civil Aviation Organization (ICAO) is converting to a three letter code, but it will not be completed until 1993.

Another means of communication with aircraft operators is the United States Aeronautical Radio Incorporated (ARINC) or the European Societe Internationale de Telecommunications Aeronautiques (SITA) communications network. These are private service networks for transmission of messages to commercial operators. Current electronic files of these listings for commercial operators are available from the IATA in Quebec, Canada. These files would provide for effective delivery of telegraphic messages. These files will also serve as a reference for operator addresses and allow for the use of commercial operator data provided by data suppliers where the address of the operator is either missing or incomplete.

PROTOTYPE DEVELOPMENT.

The development of the prototype system will take place during the first 10 months of Phase II. During this time contracts will be signed with data suppliers and the programs will be written to enter commercial data into the system. Prototype programs will also be written to produce reports, update, and administer the system. The prototype system will be demonstrated to the FAA.

PROTOTYPE SYSTEM TEST.

Once a prototype system is developed the system will undergo extensive testing. Tests will be developed which determine communications capabilities, ability to answer typical inquiries, ease of implementation of updates, and ability to carry out other administrative tasks. Modifications will be made in response to problems encountered during the tests.

SYSTEM OPERABILITY.

Once the prototype system has been developed and tested, it will be service tested by operating for a period of 10 months. Selected FAA offices will be identified as experimental users of the system. Careful logs will be maintained to record problems encountered and further corrective action will take place if needed.

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OPERATIONAL SYSTEM.

The last task in Phase II will be to prepare the system to be operated by the FAA or their designate. This will require careful coordination with the FAA. User manuals will be prepared and the system will be thoroughly demonstrated to FAA personnel during the latter part of Phase II.

Revised Program Plan

Data Supplier Subcontracts

System Test Plan

Prototype Development

System Test & Demo

Prototype Operation

Draft Report on System

Prepare Manuals

FAA Acceptance

FAA Review

Final Report

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0    2    4    6    8   10   12   14   16   18   20   22   24
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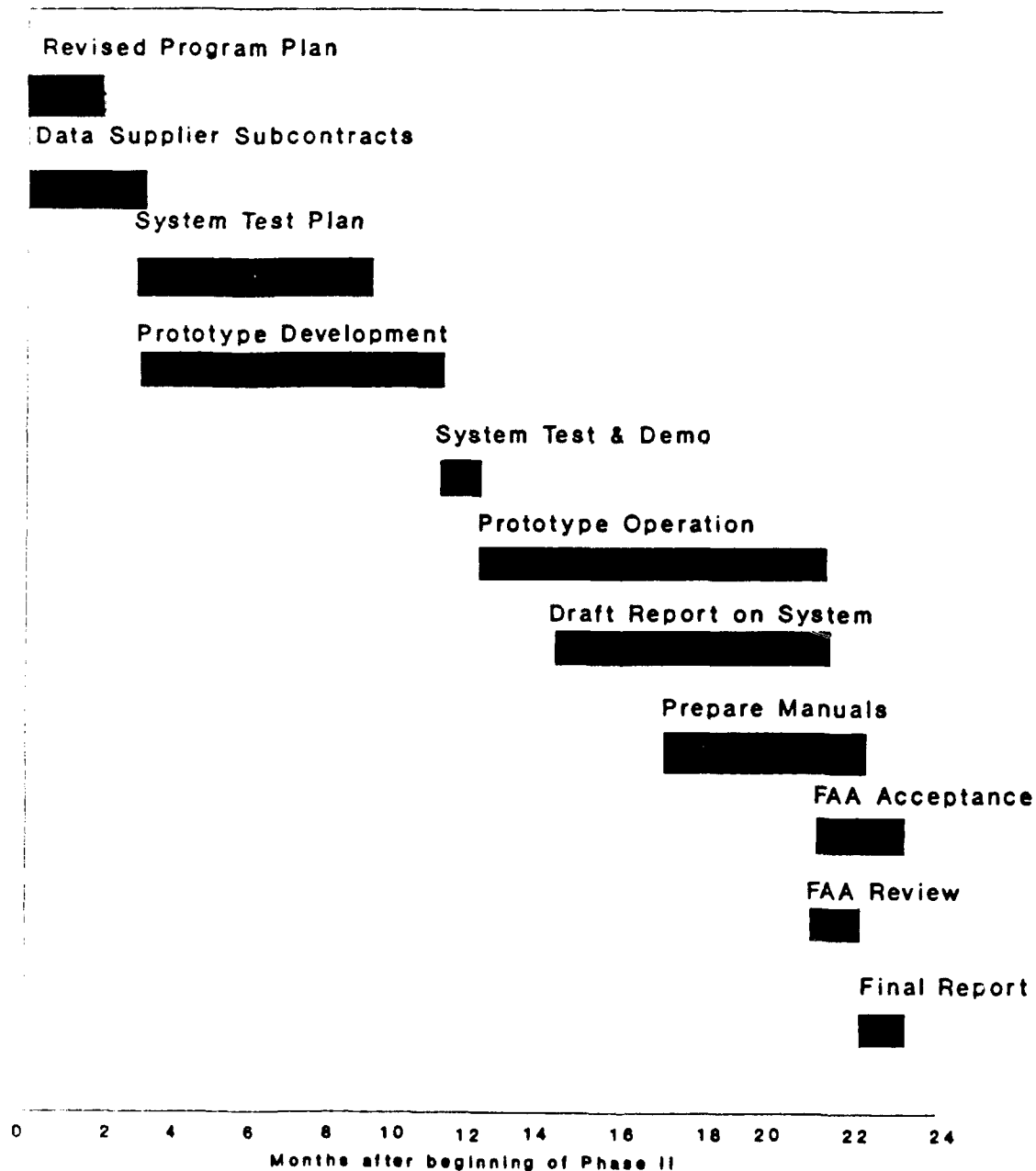**Months after beginning of Phase II**

FIGURE 2 - PHASE II SCHEDULE

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IMPLEMENTATION OF FINAL OPERATIONAL SYSTEM

TRANSITION.

Preparation will be made to effect an orderly transition from the prototype system operating at WSU to a continuing operational information system for the FAA. See Appendix A and B for specifications. This will involve extensive manuals and considerable cooperation and coordination with FAA representatives during the final stages of Phase II. Careful arrangements will have to be made to ensure that the appropriate staff and hardware is available to receive the system. It will also be necessary to arrange options to continue the contracts with data suppliers. Options for data will be negotiated to continue for an additional year. This will permit the orderly transfer of the software developed at WSU to a site selected by the FAA.

> *It would not be advisable that one of the data suppliers act as system administrator because of the desire of each of the data suppliers to protect the proprietary rights of his data.*

ROUTINE OPERATION.

In order to operate effectively, the system will require administration, management, programming, and technical support. The following paragraphs describe the major elements in this support.

1. **Data source development.** This activity was described in more detail in a previous section, but it is important to emphasize that this is a continuous activity. The system administrator will have to work closely with existing data suppliers and be constantly searching for additional suppliers. Efforts will have to be made to obtain and maintain agreements with the best qualified data suppliers. This will be done with concise data specifications, competitive bidding, and fair evaluation of data value.

2. **Data preparation.** Because there will be multiple data suppliers it will be necessary to prepare data for the update function. Much of this can be automated, but some cannot. Even though the updates will follow a specified format there will still be some important coordination work. The most important aspect of the data preparation activity will be the maintenance of the tables which convert the data suppliers keys to FAA keys. These keys are the data fields which uniquely define an aircraft and are absolutely essential to the integrity of the Operator Information System. Every time a new type of aircraft enters the system a new key must be

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established. This key must be consistent with the key assigned by the FAA, and easily translated from the data supplier's information.

3. **Follow-up.** In any data base of this size there will inevitably be exceptional cases. These exceptions could arise from unusual aircraft modifications or errors made by the data suppliers. In addition, coordinated efforts must be made with the FAA and the data suppliers to actively follow up letters which have been returned because of wrong addresses. Those letters, with address corrections not available through inquiry with the postal service, will be returned to the data supplier for resolution. The system administrator will coordinate these matters.

4. **Updates.** The present plan is that updates will be carried out monthly, either by media (tape or diskette) or by electronic mail. Because there are multiple data suppliers it is desirable that these updates be staggered. Hence the update function will be nearly continuous and involve full-time administrative support.

5. **Special reports.** The aircraft operator information system will be menu driven. The most commonly requested reports will be selected from a menu and it will be possible for many other reports to be prepared from a menu. Occasionally, special reports will be required which are not predefined and cannot be prepared from the menu. These reports will have to be prepared by a staff member. A record will be made of the report and if it seems likely that such a report will be needed again the report should be included as one of the selection items in the menu.

6. **Bulletin board.** A bulletin board capability will be included as part of the software. This capability will permit the system administrator to anticipate current data needs (in the event of an accident, for instance) and present certain data or information as part of a logon message.

7. **Reports from logs.** The system administrator will be responsible for requesting and generating reports from the update logs and the inquiry logs. These reports will assist the administrator in monitoring system use and tracking potential security violations.

8. **Backups.** It will be the responsibility of the system administrator to maintain backups of both software and data.

9. **System shutdowns.** Methods will be developed and applied to handle any incident of a system shut-down. This requires an immediate awareness that a shut-down has occurred and procedures for start-up and retesting.

10. **Security.** It will be the responsibility of the system administrator to assign and unassign user IDs and maintain the password system. The administrator will also be required to monitor the entire system to maintain both security and protect proprietary data.

11. **Data Integrity.** As new data suppliers (or aircraft) are brought into the system it will be necessary to do careful planning to prevent overlaps and develop new data preparation procedures.

12. **User support.** It will be important that users be supplied with information and training in the use of the system. Telephone support will be required as well as updates in handbooks and instructions.

SYSTEM SUPPORT.

In addition to the routine operations of the data base function, the system itself will require both maintenance and periodic replacements and improvements.

1. **Personnel.** A full-time system administrator will be responsible for making both programming and technical support personnel available. The computers and communications equipment will require periodic maintenance. Since no large software system is completely bug-free, occasional programming will be needed to tune the system. Programmers will be needed to write the programs which generate new reports or include additional data fields as they become needed and available.

2. **Expansion.** As the number of aircraft increases (the commercial fleet is projected to double in the next 15 years) and the size of the data base gets larger it will be necessary to add additional capabilities. The need for additional disc space and the capability to handle a larger volume of inquiries is inevitable. The modular nature of the proposed system makes it possible to enlarge the system incrementally and eliminates the need for a large amount of excess capacity, but it also requires more frequent increases in capacity. Improvements in technology must also be included as needed.

3. **Updates.** As communications technology improves it is likely that updates can be further automated, or even brought on-line. The proposed OATS hardware and software make this easy for the FAA. The principal limitation will be with the computer and communications capabilities of the data suppliers. This feature will have to be carefully coordinated with the data suppliers.

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SUMMARY

This *International Aircraft Operator Information System Master Requirements and Implementation Plan* defines the FAA's requirements for aircraft operator information and presents a plan for meeting them. These requirements were determined in several ways: interviews with a wide variety of FAA personnel, examination of governmental regulations, and examination of the telephone logs of the feasibility demonstration call-in service. The principal requirement to which this effort is addressed is the need to provide names, addresses, and telephone numbers of aircraft operators for the timely distribution of airworthiness safety information. Other important requirements are for aircraft histories, fleet listings, and listings of aircraft operating in a particular foreign country or region. These requirements are broader than just U.S. registered aircraft.

Research was done to determine the nature and the availability of the data required to support an aircraft operator information system. Sources were sought for these data and a careful evaluation was carried out. The results of these investigations are fully described in *Evaluation of Existing Aircraft Operator Data Bases* (see reference 3). It was found that a number of commercial data suppliers are able to address portions of the FAA's aircraft operator information requirements. No single supplier could meet all of these requirements and hence multiple suppliers are required. It was also found that there are still significant gaps in the data. In particular, no suitable supplier for operator information on single-engined general aviation aircraft was identified.

An important step in the development of an operational Aircraft Operator Information System is the creation and operation of a prototype system. This effort constitutes Phase II of this program and will take place over a period of 23 months. During this time bids will be sought and contracts will be signed with data suppliers, the prototype system will be developed and tested, and the system will be operated for 10 months. At the end of Phase II an operational turn-key information system, along with suitable manuals and training, will be delivered to the FAA. An orderly transfer of the prototype system to the FAA will have to be carefully coordinated.

The information system described in this document will require the preparation of computer software. The general specifications for this software as well as for the operation and administration are provided along with the required data fields.

In order for the information system to function an operating environment must be specified. The Department of Transportati⸲-wide Office Automation Technology and Services (OATS) environment will serve as the standard base platform. This platform uses the

UNIX operating environment, an AT&T server and networking system, and the Oracle data base. Both the hardware and software specifications are within the current capabilities of OATS and the known data suppliers. The suggested system can be expanded as further capabilities emerge. The OATS environment will soon be the standard for all FAA offices.

CONCLUSIONS

1. An automated aircraft operator information system is needed by the FAA to meet its obligation to distribute airworthiness safety information and other information such as aircraft histories, fleet listings, and aircraft operating in a particular region.

2. The data needed to support these requirements exist in the private sector.

3. No single supplier can satisfy all these requirements.

4. Multiple data suppliers will be needed to permit the FAA to use the best features of each supplier as well as protect itself from being totally dependent on a single supplier.

5. Present commercial data suppliers can provide information to meet most FAA requirements. However, no data supplier presently offers complete electronic operator files for single-engined general aviation airplanes. Several data suppliers have been identified that could supply these data if a market is created for it.

6. The DOT's new OATS platform will provide an excellent environment for this program. The OATS platform is compatible with FAA data base plans and offers the networking capability needed to rapidly distribute aircraft operator information to all FAA offices.

7. Maintenance and management of the new system should be an FAA responsibility since the data will be acquired from multiple suppliers. In particular, no one of the data suppliers should be the system manager.

REFERENCES

1. Action Notice, U.S. Department of Transportation, Interim Notice on Use of the Office Automation Technology and Services Contract, March 22, 1990.

2. John J. Hutchinson and Frank H. Macheers; "Program Plan-International Aircraft Operators Data Base", Report No. DOT/FAA/CT-89/34, Institute for Aviation Research, December 1989.

3. John J. Hutchinson, Frank H. Macheers, and Barbara K. Smith; "Evaluation of Existing Aircraft Operator Data Bases." Report DOT/FAA/CT-90/18, August, 1990.

4. *Computer Data Handbook*, U.S. Department of Transportation, Federal Aviation Administration, Sept. 1987.

5. *The Standard Aircraft Identification Code Definition, Methodology and Table for ASAS Subsystems*, Department of Transportation, September 1989.

6. *Airworthiness Directives*, Order 8040.1B, Department of Transportation, Federal Aviation Administration, January 24, 1989.

7. *Census of U.S. Civil Aircraft, Calendar Year 1988*, Department of Transportation, Federal Aviation Administration, Office of Management Systems, December 31, 1988.

8. "Airworthiness Standards: Normal, Utility, and Aerobatic Category Airplanes," *Code of Federal Regulations, Title 14*, Office of the Federal Register, Revised January 1, 1987.

APPENDIX A

INFORMATION SYSTEM SPECIFICATIONS

The information system described in this document will require the
preparation of software. In order for this to occur in an orderly
manner it is necessary that specifications be prepared which
describe the flow of data and other system requirements. Also
included are specifications for the required hardware and operating
environment.

DATA FLOW.

The data flow diagram for the system model is shown in Figure A1.
This figure shows that there are to be three modes in which the
system will function. The data flow diagrams for these are:

    1. The Inquiry Mode (Figure A2).
    2. The Modify Mode (Figure A3).
    3. The Data Base Administration Mode (Figure A4).

For the purpose of these specifications the entire set of files
which contain aircraft, owner, and operator information will be
referred to as the "Operator Data Base".
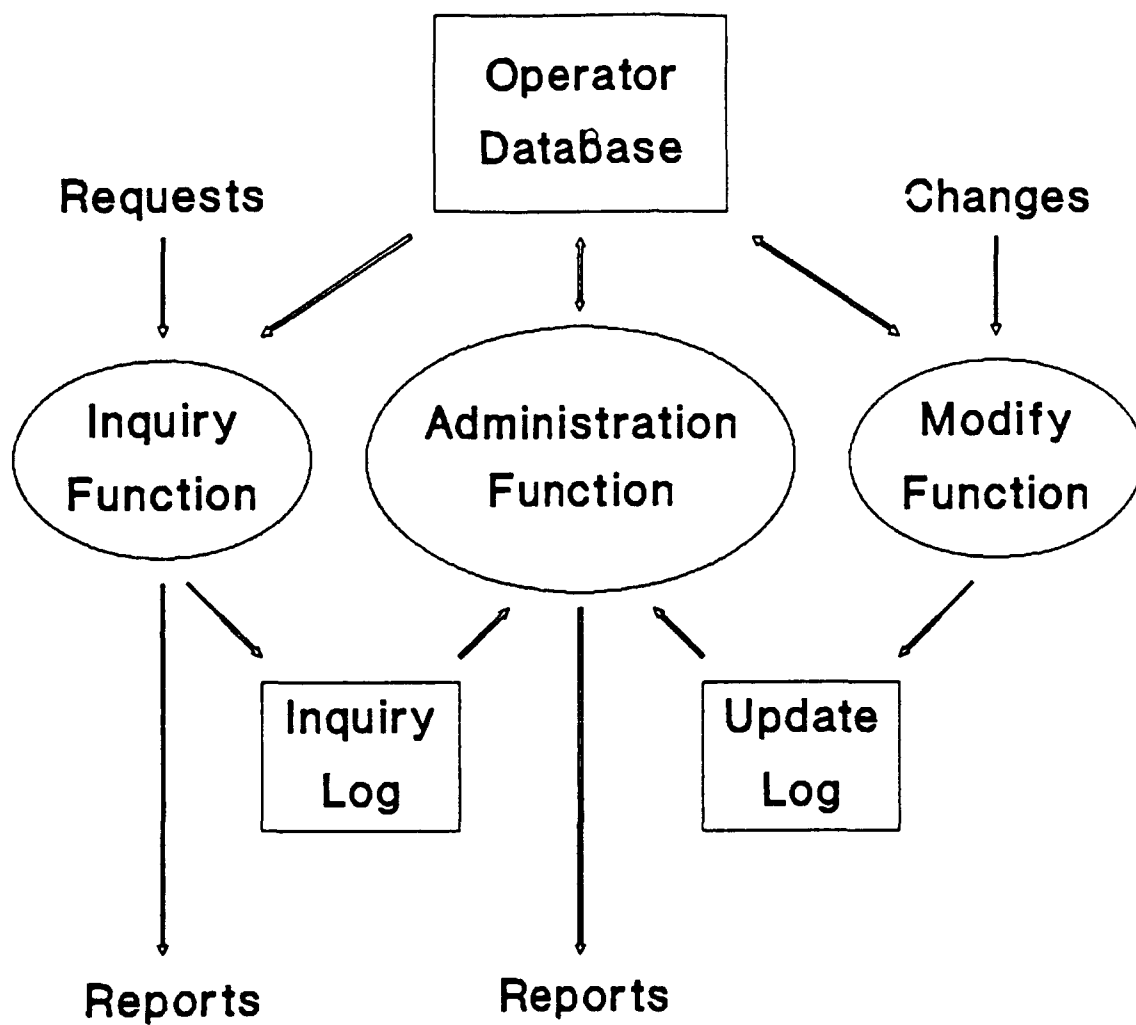
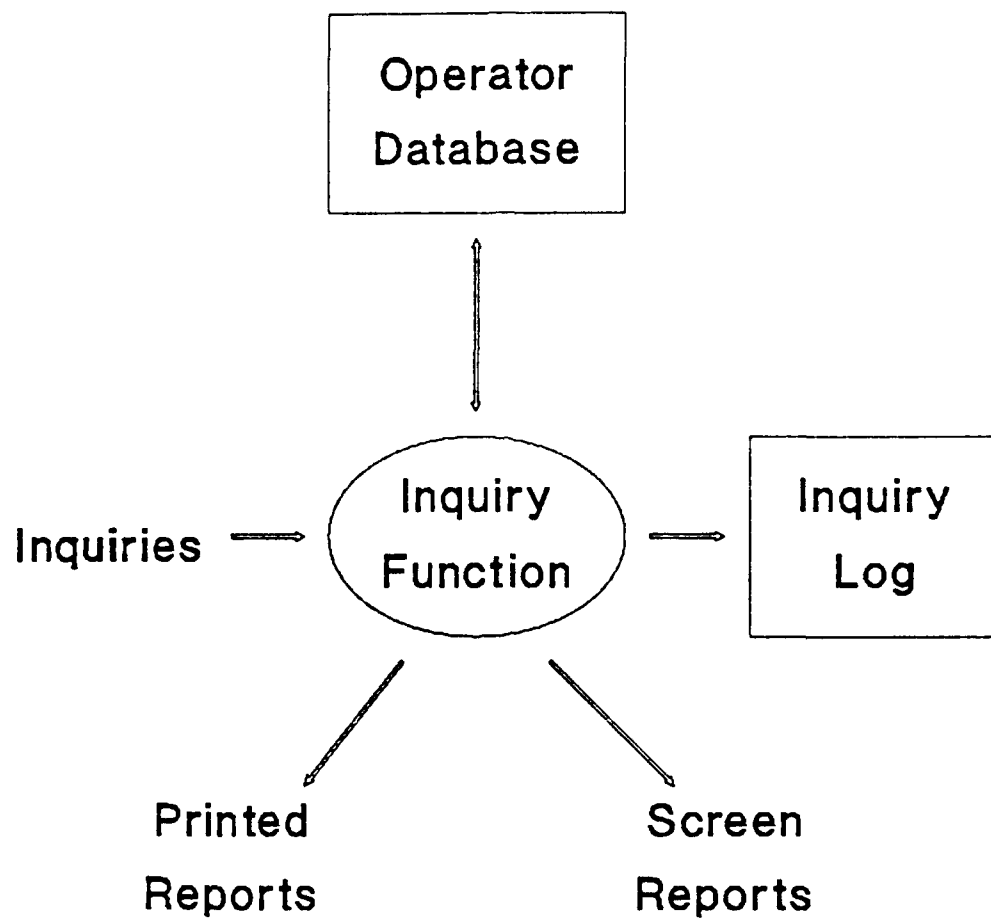**FIGURE A1 - AIRCRAFT OPERATOR INFORMATION SYSTEM MODEL**
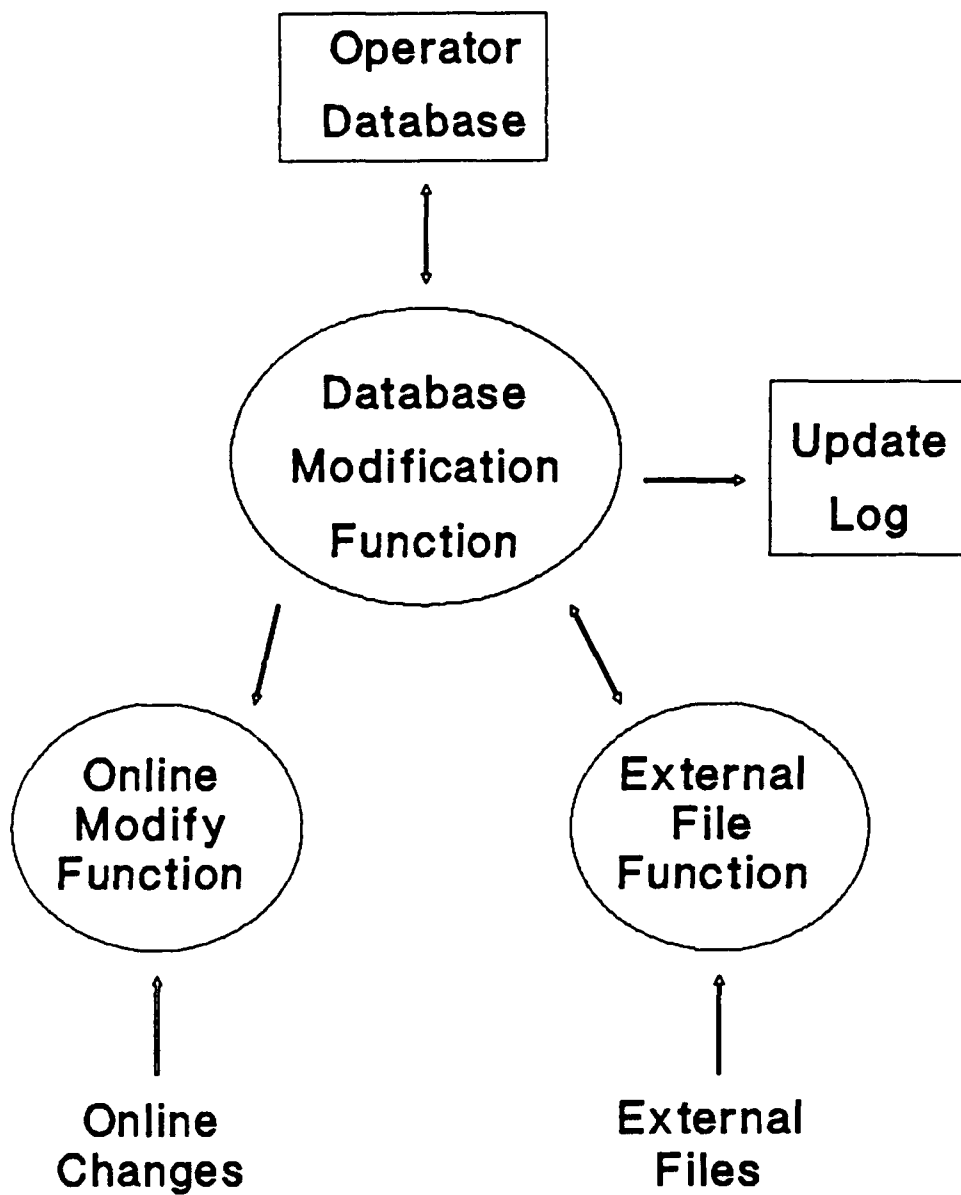
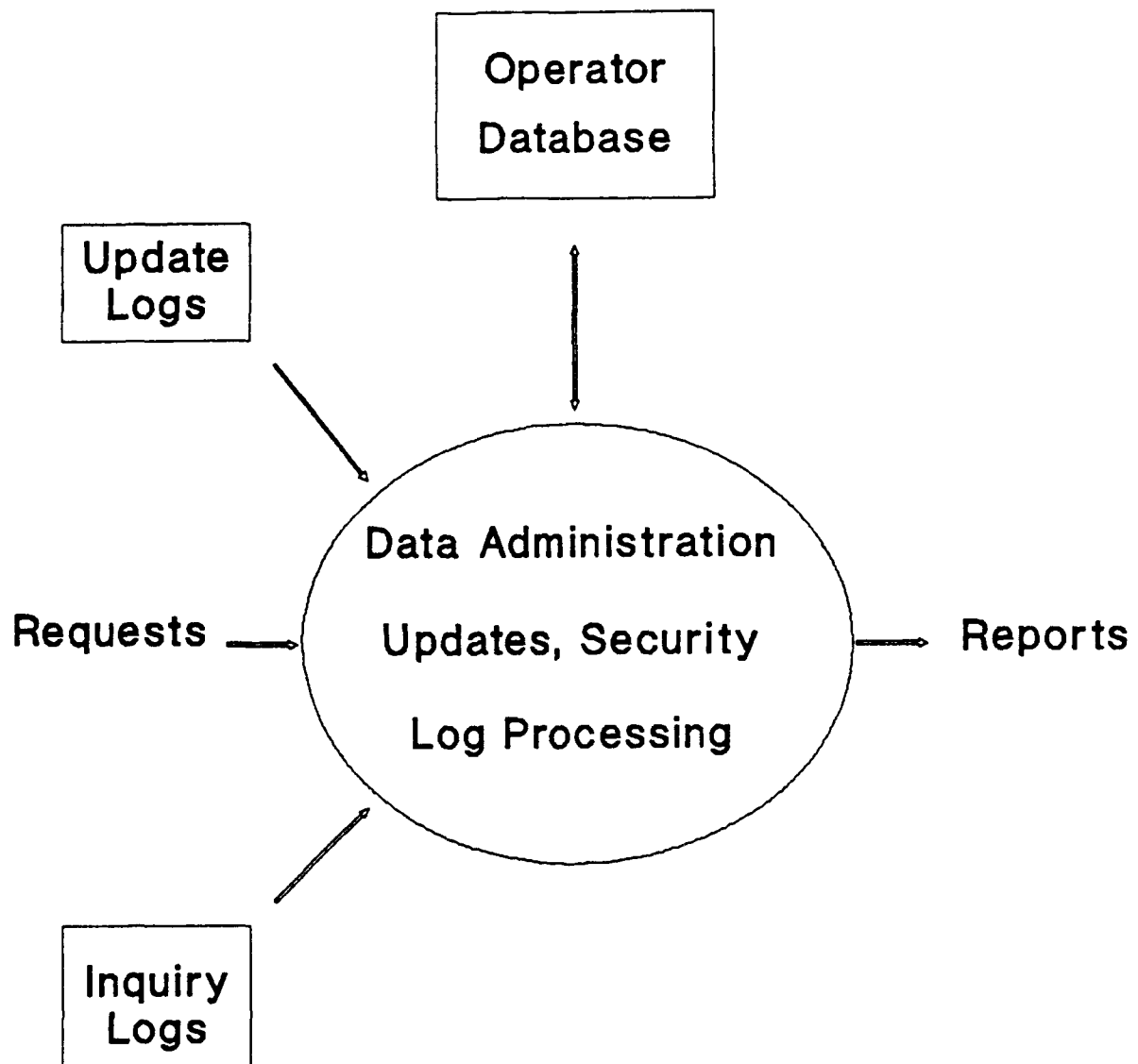FIGURE A2 - INQUIRY FUNCTION

FIGURE A3 - MODIFY FUNCTION

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FIGURE A4 - DATABASE ADMINISTRATION FUNCTION

FUNCTIONAL REQUIREMENTS.

There are to be three general areas in which the system will function in addition to simple ways to access and exit the system. These functional requirements are as follows:

1. Access to the system.

2. The Data Base Inquiry Mode.

3. The Data Base Update Mode.

4. The Data Base Administration Mode.

5. Exit the system.

ACCESS TO THE SYSTEM. There will be a simple method of access to the system based on a name and a password combination as follows:

1. Access to the Inquiry Mode. Entry to the Inquiry Mode will be made by entering the system, typing "QUERY", and entering a valid user ID and password.

2. Access to the Update Mode. Entry into the Update Mode will be made by entering the system, typing "UPDATE", and entering a valid user ID and password.

3. Data Base Administration Mode. Entry to the Data Base Administration Mode will be made by entering the system, typing "DATA BASE", and entering a valid user ID and password.

DATA BASE INQUIRY MODE. Users in the Inquiry Mode can obtain information from the files at any time, but will not be able to add to, modify, or update the files in any way. Access to the Inquiry Mode will be available twenty four hours per day from a personal computer via a modem and telephone line. Access to the Inquiry Mode will be limited to authorized users with an access code/password.

The information provided will be in the following forms.

1. A bulletin feature will provide timely information of a general nature at any time by pressing one of the function keys. The system administrator will be the only one authorized to include an item on the bulletin board.

2. Predefined screen reports will be made available by selection of this option and making selections from a menu. Short reports of this type can be printed at the user's site by using the print screen feature on the personal computer.

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3. Predefined printed reports (such as mailing labels) will be made available by selection of this option and making selections from a menu. The reports will be sent to the user in the selected formats via electronic mail and then received and printed at the user's site.

4. User defined screen reports will be made available by selection of this option from a menu. The generation of the report will be menu driven. Short reports of this type can be printed at the user's site by using the print screen feature on the personal computer.

5. User defined printed reports will be made available by selection of this option. The generation of the report will be menu driven. The reports will be sent to the user in selected formats via electronic mail and then received and printed at the user's site (due to limitations in many foreign telephone systems this option will be the only practical method of obtaining reports for user's in foreign countries).

6. Knowledgeable users will have "read only" access to the files to prepare reports using OATS software.

There will be a hidden inquiry log which will contain the name, password, and other details.

DATA BASE UPDATE MODE. All functions in this mode will require the user to have a data base update security level.

1. The Data Base Update user will be allowed to modify or add new information to the Operator Data Base from the user's terminal. The user will be able to call a copy of a record from the data base to the screen and edit the record. The user may alternately create a new record. Each user entry will be checked against the Operator Data Base to determine whether it is a modification or addition transaction. The user input entered into the data base will be standardized by selections from pop-up menus (aircraft type and operator name) and the data verified via standardized formats. The system will prepare a transaction record in a standardized form to be sent to the data base modification function. Standard operations will include replace, insert, update, and delete. The data base modification function will carry out the actual data base modification using the revised copy of the file.

2. The external input entered into the Operator Data Base will be from multiple sources and in the different formats from each of the data suppliers. It will be available from vendor supplied discs. The input may either be new data or may be modifications of, or replacements for, existing data. These files will require a limited amount of preprocessing before

they can be sent to the data base modification function. Standard operations include replacement, insertion, update, and deletion. The modified or new data base records will be prepared for the data base modification function.

3. The data base modification function provides capability to carry out the requested replacements, insertions, updates, and deletions. This function is not directly accessible by the update user, but instead processes requests from functions that manage user/external interfaces. This function will add, replace or delete records in the data base based on a command from one of the functions. This function will also write an update log of all changes to the data base.

DATA BASE ADMINISTRATION MODE. The data base administrator will have access to, and responsibility for, the entire data network. The administrator will have the highest security to perform the following tasks:

1. Give accounts and set password control,

2. Control access to the INQUIRY LOG,

3. Control access to the UPDATE LOG,

4. Do data base housekeeping,

5. Be responsible for system and data backups,

6. Be responsible for the restoration of the system and the data base after a shut-down,

7. Answer any ad hoc inquiry for special projects.

EXIT THE SYSTEM. The user will be allowed to exit the entire system by using a command word or function key from a set of possible words or keys. These possible words should include exit, quit, stop or end. The user will also be allowed to exit from the Inquiry Mode, the Modify Mode, or the Data Base Administrator Mode to another level by using the appropriate access sequence or function key.

AIRCRAFT OPERATOR DATA REQUIREMENTS.

This section specifies the contents of the separate files DATA
BASE, INQUIRY LOG, and UPDATE LOG.

DATA BASE CONTENTS. As needed to satisfy program objectives, the
main data base will contain all or some of the following fields.

FILE FORMAT

FIELD NO.	DESCRIPTION OF CONTENTS
1	Aircraft Manufacturer Code
2	Aircraft Model Code
3	Aircraft Series Number
4	Aircraft Serial Number
5	Year Manufactured
6	Owner Status
7	Aircraft Status
8	Engine Manufacturer
9	Engine Model
10	Engine Series
11	Number of Engines
12	Date Purchased
13	Registration Number
14	Registration Type
15	Operator Name
16	Operator Address Line 1
17	Operator Address Line 2
18	Operator Address Line 3
19	Operator City
20	Operator Zip Code
21	Operator Country Code
22	Operator Fax Number
23	Operator Telex Number
24	Owner Name
25	Owner Address Line 1
26	Owner Address Line 2
27	Owner Address Line 3
28	Owner City
29	Owner Zip Code
30	Owner Country Code
31	Owner Telex Number
32	Owner Fax Number
33	IATA Code
34	ICAO Code
35	Comment Field
36	Prime Data Vendor
37	Geographic Area Code
38	Accident Status Code
39	Information Source Code
40	Date Aircraft Added to File

41	Date Aircraft Revised
42	Audit Trail Data
43	FAA Registration Data
44	Special Internal Use Data

This listing shows the description format of the data file for a single aircraft. Historical data will require successive files with the appropriate status codes.

INQUIRY LOG. The inquiry log will contain the following information.

FILE FORMAT

FIELD NO.	DESCRIPTION OF CONTENTS
1	Date of Request
2	Time of Request
3	Authorized User Identification Code
4	Type of Request
5	Form of Data Request

UPDATE LOG. The update log will contain a complete audit trail of all data base activity. This log will be used to insure data integrity and will be used to maintain a detailed ledger of data base activity. The update log will contain the following information.

FILE FORMAT

FIELD NO.	DESCRIPTION OF CONTENTS
1	Date of Update
2	Time of Update
3	Update Source Code
4	Before Image
5	After Image
6	Comments

SECURITY. The system will have three levels of internal security. The inquiry level will allow users to read only from the files and not directly alter the data base. Security at the second level will be limited to those users authorized to alter the files with the expected updates and additional aircraft to be listed. The highest security level will be limited to the data base administrator, who can modify structure, add or delete users, and perform any other aspect of data base maintenance.

MISCELLANEOUS SPECIFICATIONS.

HARDWARE AND SOFTWARE CONSTRAINTS. The basic hardware system which has been selected for the prototype is the AT&T 6386 model S client/server system with the Starlan networking configuration. The operating environment will be UNIX and the basic data base software will be Oracle using the SQL query language. The AT&T system is modularized. This will permit enhancements of performance by incremental additions of discs and file servers. Moreover the Oracle software runs without modification on most computers. This will permit order of magnitude increases in performance without major new software development.

HUMAN ENGINEERING. The system should not assume any level of computer expertise for the inquiry user of this system and only minimal knowledge for the update user.

ACCESS CAPABILITIES AND LIMITATIONS. The system will support multiple users simultaneously.

INQUIRY AND MODIFICATION USER INTERFACE CAPABILITIES AND LIMITATIONS. The system will allow the user to correct any data fields within an inquiry or modification transaction definition. When the user is satisfied with the input, the transaction can then be committed to execution. The system will allow the user a graceful exit from any inquiry or modification before execution.

USER ERRORS. The system will identify user data entry inquiry or update mode errors and allow for user correction of the fields in error. The system will notify users of any data base transaction failures. The system will notify the user of any password errors and allow for a maximum of two retries on each password entry.

TRAINING AND SUPPORT. The system will provide on-line definition for inquiry and update functions. Operation manuals will also be provided.

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APPENDIX B

HARDWARE AND SOFTWARE SPECIFICATIONS.

The Department of Transportation-wide Office Automation Technology and Services (OATS) environment contract was awarded to American Telephone and Telegraph (AT&T) on December 21, 1989. The award culminates an effort begun in 1986 to address problems caused by incompatibilities among office automation, computing, and networking technologies throughout the FAA and DOT.

OATS will serve as the standard base platform for implementing office automation, distributed computing, and networking across organizations and program activities throughout the FAA. When OATS is fully implemented, the FAA will be able to communicate readily through means of electronic mail and document interchange, access and share a wide range of data across organizational platforms, share software without needing to redesign or convert them to different platforms, provide departmental level data processing to access large-scale data processing facilities, and link to other DOT and governmental organizations or industry groups through standard telecommunications gateways. Both the hardware and software specifications in this program are within the current capabilities of OATS and the suggested system can be expanded as further OATS capabilities are made available.

HARDWARE.

6386/33 Model S. The Model S is AT&T's most powerful LAN server. It is pre-configured and tested at the factory with 33MHz CPU, 8MB RAM, 300MB SCSI hard disk and adapter, 1 1.44MB floppy, UNIX, PMX/TERM E-mail software, 10 I/O slots, StarGroup Software, Starlan 10MB NAU, and PMX/Starmail LAN based E-mail software. The console for the Model S can be either a monitor and keyboard or an Ascii terminal. In this configuration a PC running terminal emulation software is used as the console. This offers added functionality. The Model S comes standard with a 1 year on-site warranty. The hardware specifications are as follows:

AT&T Starlan

	Description	QTY
3715-332	6386/33 Model S	1
3708-381	6300WGS as Term.	1
2610-010	Starlan 10MB Hub	1
2614-110	10MB NAUs	8
69080	ISN-AIM8	1
1290-3G2	Async. Gateway	1
37750	IPC 900 8 Ports	1

SOFTWARE.

<u>ORACLE</u>. Oracle is a powerful relational data base management system used by many commercial establishments for their data base needs.   Oracle offers a complete implementation of SQL, the industry-standard relational data base language. It runs on an impressive range of mainframes, minis, workstations and PCs, and supports an equally large number of operating systems.   It implements the full power of a relational data base while also providing a complete family of programming and decision-support tools, designed for users ranging from application programmers to the casual user. The following is a brief description of some of the tools available with Oracle.

a. **SQL*Plus.** SQL*Plus is a 4th-generation tool that delivers a full implementation of SQL as well as powerful report-writing and data-transfer capabilities.   One can execute SQL statements and formatting commands interactively or from stored command files. Hence, one can perform ad hoc queries and data base administration tasks or run pre-defined reports with ease.

b. **SQL*Menu.** SQL*Menu lets one design dynamic menu interfaces to all applications, whether they are built using Oracle tools or any other software product. All menus are driven by Oracle tables, so one can create and maintain complete systems just by changing entries in a table.   In SQL*Menu, one can even designate authorization levels, so users see only those choices for which they are authorized. Novice users choose from the menus by pointing and selecting whereas advanced users can navigate quickly with keywords.

c. **SQL*Forms.**   Using SQL*Forms, one can create forms-based transaction processing applications quickly and efficiently, all without programming. Simply by specifying the needs one can generate applications.   SQL*Forms facilitates modifications to the applications thereby reducing the time spent in the development of applications.

d. **SQL*ReportWriter.**   SQL*Report Writer helps one to create everything from basic text to sophisticated multi-query reports.   Built-in arithmetic, date functions, and break handling are just a few of the numerous capabilities of SQL*ReportWriter.

e. **PRO*C.** PRO*C is a powerful programmable interface that lets one embed SQL statements in the programming language C. The precompiler translates the SQL statements into appropriate C source code.   One can make use of PRO*C to develop applications if it is more difficult to implement these applications using the standard Oracle tools.

This software configuration assumes a client/server data base relationship configuration using an AT&T UNIX 6386/33 Model S as a Starlan server and MS-DOS compatible microcomputers as clients. Options for ISN or dial-in modem access and client disk data base are included. Options for accessing remote Oracle and non-Oracle data bases on many other hardware platforms including IBM/370-SQL/DB2 and DEC/VAX/VMS-RMS/others via network or async connections and interfaces to "C", DbaseIII, and Lotus 123 are also included.

OPERATING ENVIRONMENT AND SOFTWARE

-                         Description

-6386/33 Model S UNIX Software:

1331-SAM Oracle RDBMS 6.0 (2 to 8 users) UNIX data base kernel for the 6386.

1331-SAX Oracle SQL*Net 6.0 (2 to 8 users) Allows access to remote and distributed data bases.

1331-SAP Oracle Starlan (TLI) Protocol 1.0 (2 to 8 users) Allows SQL*Net to access Starlan.

1331-SAV Oracle SQL*Plus 3.0 (2 to 8 users) 4th generation tools to allow for direct UNIX access of Oracle and remote data bases from a terminal.

MS-DOS Client Software:

1021-RCB Oracle Application Tools 5.1B Bundle of Oracle development and user tools including: SQL*Plus, SQL*Menu, SQL*ReportWriter, SQL*Forms, and PRO*C.

1021-RCC Oracle Runtime LAN Application 5-Pack (5 users) Runtime license for SQL*Forms, SQL*Menu, SQL*Plus, and SQL*ReportWriter.

HardBeta Oracle SQL*Starlan Netbios Software (LAN license) Allows MS-DOS clients to access Starlan.

1021-RCJ Oracle SQL*Net Async Allows PC to dial server through ISN and process data as if it were on the network.

1021-RCM Oracle DBXL release 5.1B

1021-RCT Oracle for 123 release 5.1B

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APPENDIX C

AIRWORTHINESS DIRECTIVE DISTRIBUTION PROCESS

The key organization for distribution of FAA aircraft safety information in the various forms of Airworthiness Directives (ADs) is the Engineering and Manufacturing Branch (AVN-110). They manage the airworthiness directive distribution program, exchange airworthiness information with International Civil Aviation Organization (ICAO) member countries, and develop airworthiness directives for foreign manufactured products. Airworthiness directives are recognized as the key elements of the safety rulemaking responsibilities placed upon the FAA by the Federal Aviation Act. The distribution discussed in this section exceeds the basic legal requirement which requires only *Federal Register* publication.

The distribution process involves airworthiness directives in three categories. In order to solicit public comments the ADs are initially issued as a Notice of Proposed Rule Making (NPRM) and later published as a final rule. Under the second category the AD may be published as an immediately adopted rule with an effective date 30 days after publication to allow time for receipt of comments. Under the third category, the emergency rule, the AD is initially issued by a telegram or as a priority letter. The latter category requires distribution within 10 hours.

The FAA Engineering and Manufacturing Branch personnel at Oklahoma City, OK confirms that a large part of their work load in the past year has been issuing NPRM and final rule information. They have quoted a two-hour response time allowed to prepare addresses for telegraphic messages. This involves hand sorting to reduce duplications. Resolving conflicts associated with returned messages that cannot be delivered through the mail are other sources of lost effort and unnecessary expense.

DISTRIBUTION. All ADs are presently distributed to addresses on special mailing lists maintained for AVN-110. These lists include FAA offices, military services, bilateral countries, and special interest groups. In some circumstances, when it is desirable to help in the development of the final rule, distribution of a Notice of Proposed Rule Making is made to owners of U.S. registered aircraft, known operators, etc.

Notification under emergency rules (immediately adopted ADs) issued by telegrams is directed to: owners of U.S. registered aircraft, known operators or designated agents of U.S. air carriers, the manufacturer, ICAO Member States that have notified the FAA of registration of the affected product on their registry, bilateral countries, and those addresses maintained on a telegraphic list of recipients. The telegraphic lists include FAA offices, military

services, National Transportation Safety Board (NTSB), and special interest groups. Distribution of adopted ADs is made to some of the same addresses by AVN-110 through the mail.

Emergency distribution rules also apply to small aircraft and includes notification of the owners of U.S. registered aircraft and known operators. Priority letters are used for a large group of aircraft. ADs applicable to a particular engine model can only be distributed to specific owners when the aircraft models on which the engines are installed are provided by the issuing office. For the same reasons, ADs which are applicable to propellers or appliances can only be distributed to owners of U.S.-registered aircraft when the aircraft models on which the propeller or appliance are known.

Reference 6 recommends the FAA obtain from the manufacturer the name, address and FAX or Telex number for the owner/operator of products purchased in the preceding three months. This procedure, if practiced, would provide the most current information.

ORIGINATING FIELD OFFICE. The Director of Aircraft Certification Service and the Manager of the Aircraft Certification Directorate, in the Central, Northwest Mountain, Southwest, and New England Regions have authority for issuance of ADs.

BILATERAL APPLICABILITY. The ICAO Member States that have notified the FAA of registration of a U.S. manufactured aircraft will receive all applicable ADs. Bilateral agreements between the United States and other countries also require exchanging AD information.

Airworthiness Directives may be issued for foreign made products. Federal Aviation Regulation (FAR) 21.29 regulates the issuance of a Type Certificate for imported products under a joint agreement Type Certificate and is applicable where the product meets basic requirements including noise and airworthiness requirements.

In summary, the distribution of airworthiness directives is applicable to U.S. Type Certificate aircraft and equipment. In addition, the guidelines provide for the notification of owners and operators of U.S. manufactured aircraft in foreign countries. The contributions that this program will make to this effort will be to provide aircraft operator information to the FAA Engineering and Manufacturing Branch (AVN-110) to assist them in the timely distribution of airworthiness information.