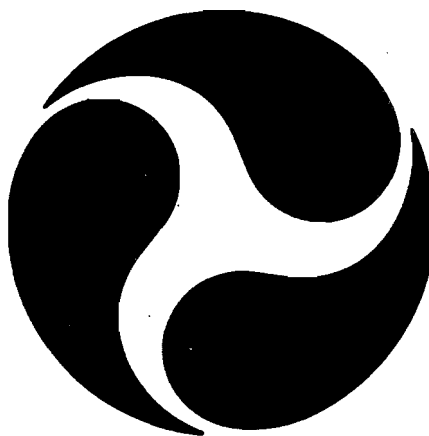


DOT/FAA/CT-89/34

Program Plan International Aircraft Operator Data Base



December 1989

**U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
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16. Abstract This Program Plan describes studies and research which will result in a Master Requirements and Implementation Plan for the creation of an international data base of all operators of United States type-certificated aircraft. This Master Plan will assess the Federal Aviation Administration's requirements concerning the availability, acquisition, and development of international aircraft operator data. Efforts will involve identifying problem areas and information gaps, and recommending solutions or options. The Master Plan will begin with a determination of the Federal Aviation Administration's needs for aircraft operator data and will conclude with recommendations of data base development. These will be directed toward meeting the requirement to distribute airworthiness safety information to aircraft operators in a cost effective manner using an automated, menu driven, filing and retrieval system.			
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EXECUTIVE SUMMARY

This program plan describes studies and research which will result in a Master Requirements and Implementation Plan for the creation of an international data base of all operators of United States type-certificated aircraft. This Master Plan will assess the Federal Aviation Administration's requirements concerning the availability, acquisition, and development of international aircraft operator data. Efforts will involve identifying problem areas and information gaps, and recommending solutions or options.

The Master Plan will begin with a determination of the Federal Aviation Administration's needs for aircraft operator data, and will conclude with recommendations for data base development. These will be directed toward meeting the requirement to distribute airworthiness safety information to aircraft operators in a cost effective manner using an automated, menu driven, filing and retrieval system.

1. INTRODUCTION.

The Federal Aviation Administration (FAA) has a continuing need to distribute timely airworthiness safety information to the operators and owners of aircraft with a U.S. type certificate. Timely notification of maintenance and repair issues and required modifications is one of the 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 United States civil aircraft registration list and several air carrier listings. The lists are not totally all-inclusive, and considerable manual cross-checking is required. These manual processing methods are very laborious, time consuming, and cost ineffective.

The 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 tiers of operators of an aircraft. The current operator, therefore, may not receive important airworthiness information. The methods presently employed by the FAA are not adequate to meet demands for current aircraft operator data. The FAA has contracted with The Institute for Aviation Research of The Wichita State University to develop a Master Requirements and Implementation Plan for the creation of an International Aircraft Operator Database. Accordingly, operator information is sought for all categories of civil aircraft. This is phase one of a possible two phase program. The duration of phase one is 10 months. Results of the first phase will consist of developing the Master Requirements and Implementation Plan, as well as locating and evaluating sources of aircraft operator data. Determination of FAA requirements will include the needs of the FAA for the distribution of airworthiness safety information as well as the needs of other FAA offices. This could be for tracking, identifying, and retrieving civil aircraft information on a domestic and international basis. The second phase, if implemented, will consist of a 23-month program to develop and implement a prototype system.

2. PURPOSE.

Phase I: Develop a Master Requirements and Implementation Plan and evaluate existing data bases.

Phase II: Develop and operate a prototype data base system.

3. PHASE I DESCRIPTION

3.1 PROGRAM STATUS.

The summary of activities projected monthly as part of the program plan is shown in table 1. The summary is shown for four functional areas: (1) describe the administrative tasks, (2) search and evaluate sources of aircraft operator information, (3) establish and operate a feasibility demonstration featuring a telephone response service, and (4) develop a master plan and a scheme for implementation.

Selection for the data supplier subcontract was made by competitive bid process. Known potential suppliers were notified of the bidding process. Notice of the search for bidders was published in the Commerce Business Daily and a bid network service called Bidnet. Twenty business concerns received the request for proposal, answers to inquiries, and a copy of the original contract. Subcontracts will be awarded in the following sequence.

Schedule of Events:

Issue request for proposals	Oct. 19, 1989
Deadline for receipt of questions	Nov. 2, 1989
Answer inquiries and questions	Nov. 11, 1989
Deadline for receipt of bids	Nov. 21, 1989
Latest subcontract award date	Dec. 4, 1989
Latest subcontract start date	Dec. 18, 1989

The subcontract participation is in two parts. The first part is providing access to aircraft operator data for evaluation of structure and content. The second part is the continuous operation of a telephone response service for up to a maximum of six months. Records of inquiries and responses required will be recorded in a log.

3.2 MASTER REQUIREMENTS AND IMPLEMENTATION PLAN (TASK I-A).

The objective of this phase is the development of the master plan requirements and a scheme for implementation. The first task in this program will be to determine the needs of the FAA for operator and owner data. These needs will be determined by interviewing selected FAA personnel and by operating a limited duration feasibility demonstration.

A log of all calls will be maintained to record the following:

1. Information requested and the time.
2. The data requested and whether they are available from electronic files or paper files or are not available at all.
3. Information provided and the time of the response.

The log of these call will be examined weekly to answer the following questions:

1. For which aircraft does the FAA need aircraft operator information? Do these inquiries fall into any categories? To what extent do the FAA's needs overlap any data gaps that might exist?
2. What other data are required in order to answer the FAA inquiries?
3. What office made the inquiry?
4. Was the answer adequate and timely?

This demonstration will also show the feasibility of using private data sources to meet FAA needs. The service will be made available to selected government offices. The offices will include at least the Aircraft Certification Service, Flight Standards Service, and Aircraft Certification Offices and will be expanded to other offices, at the option of the FAA, in order to determine FAA needs. Information will be available by calling a single number. Operating separately and independently from the FAA Aircraft Registry this service will have no direct interface with the Registry nor will it have any impact on its data.

Other potential operator data base users, such as other government agencies, will be identified. In addition, their requirements for data will be identified. Notification of these offices of the existence and methods of accessing operator data will be at the discretion of the FAA.

The system design will require an extensive knowledge of existing data source formats, existing computer hardware and software, modern telecommunications technology, software engineering and cost estimation.

Specifications for the prototype system will evolve during this phase. In addition to the design of the system, recommendations will also be made on quality control, security, update cycles, backups, data integrity, and effective operation of the system.

The resulting master plan will be included in a final report.

3.3 EVALUATE EXISTING DATA BASES (TASK I-B).

A major portion of the effort during the first phase will consist of searching for and evaluating existing sources of aircraft operator information. This effort will continue by contacting data suppliers, corporate aviation service departments, publishers, international aviation authorities, and other potential sources. Results of this effort will be documented in a separate report that includes a description of the available information and missing or unavailable information, along with proposed solutions and options.

These data will be evaluated with regard to their accuracy, completeness, integrity, and suitability as input to a distributed aircraft operator data base system. Initially, the search for private data sources began using telephone inquiries of promising sources. Particular attention will be given to those private sources which showed the promise of being able to fill gaps in governmental data. A substantial effort will be made to identify multiple sources of data. This effort will continue.

The most promising sources of data will be subjected to extensive study and evaluation. For the evaluation of private data sources, the following questions will be specifically addressed:

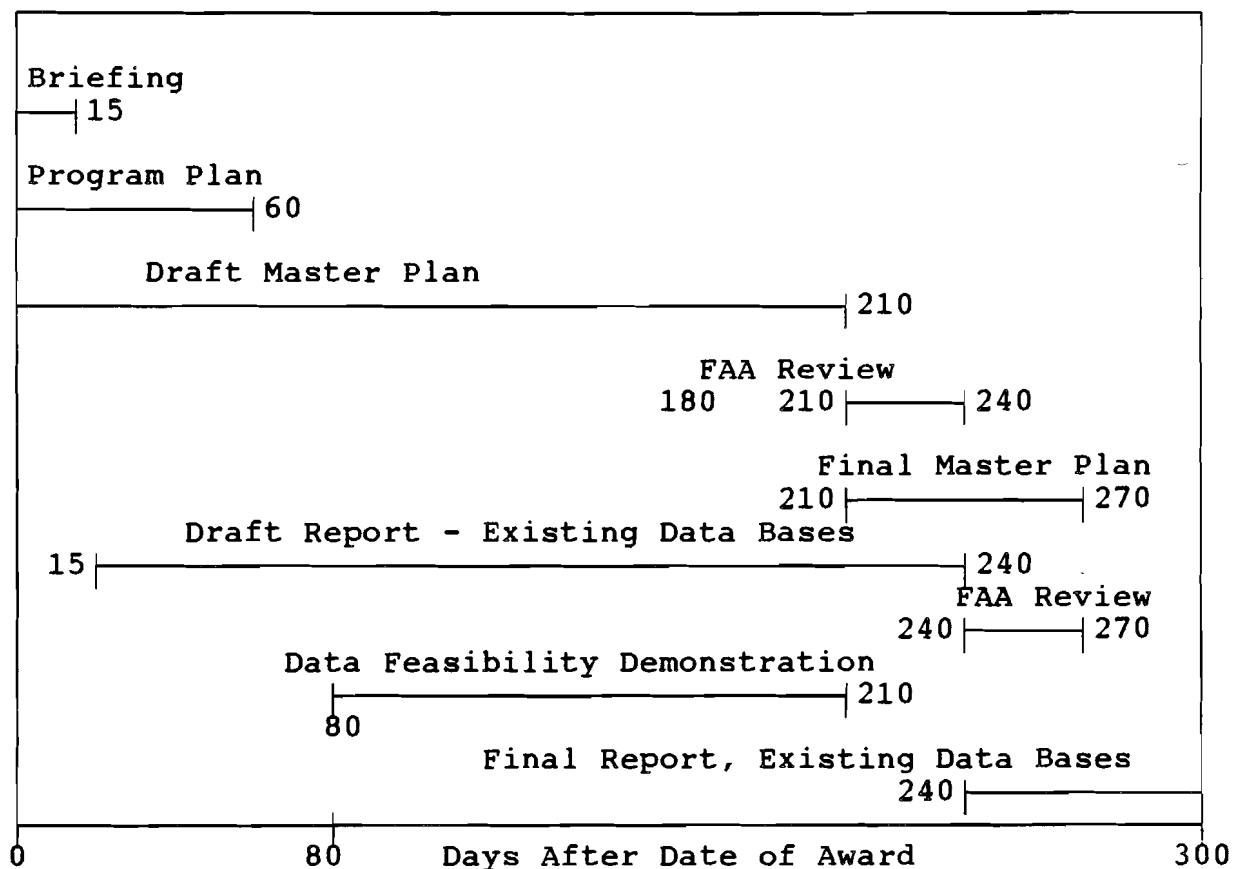
1. What information is available? For which aircraft is it available, and how does it exist (electronically or on paper)?
2. Where are the data gaps and what would be the costs in time and money to close them? For those data which exist in paper files how much time and money would be needed to include them in an electronic file?
3. What provisions are in place to assure the longevity and continuity of the data source?
4. How accurate are the data? How accurate are the data as a whole and how accurate are the data for the subset of those questions asked by the FAA?
5. Are data integrity measures adequate? Does the primary data key uniquely define each aircraft? If the same information appears in more than one field are steps taken to insure consistency?
6. What is the value added for information originally obtained from governmental sources?
7. How often are the data updated?

8. Is the format of the data compatible with the FAA's data base? What kind of protocol conversion is needed if the formats are incompatible?
9. Is the potential data supplier willing and able to meet governmental subcontractor requirements?
10. Does the proprietary nature of the data present any problems to the creation of a distributed aircraft operator data base? If so, can these problems be solved?
11. Is the data supplier's data base easy to use? Can it reasonably be included in another data base?

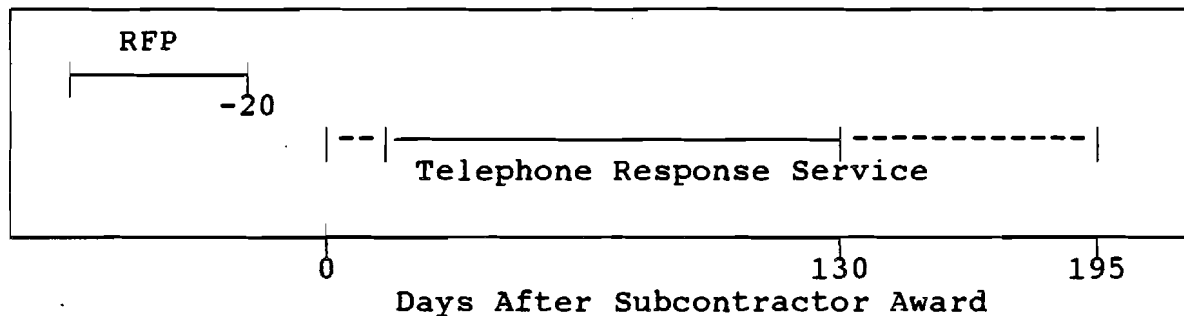
These issues are valid for all data sources and do not limit the data sources to any particular data supplier. These issues and criteria will be used, however, to qualify data sources. These studies will be compiled in a final report that lists the information gained about the data available including the categories of aircraft data available, problems, solutions, and options.

3.4 SCHEDULE.

International Aircraft Operators Data Base Phase I Schedule



Subcontractor Schedule



4. PHASE II DESCRIPTION.

Phase II depends on both the results of Phase I and FAA approval. An exact description of Phase II will appear in the Master Plan. What follows is an outline of the probable activities of Phase II.

4.1 DEVELOP AND IMPLEMENT A PROTOTYPE SYSTEM (TASK II-A).

The first 6 months of the Phase II effort will be devoted to prototype system development. An additional month will be devoted to internally running the system. Programming during this phase will be done by staff members of Wichita State University Computing and Telecommunications Center. Members of this center will provide the knowledge and skills needed to perform the system analysis, design, and testing. Staff capabilities include knowledge of existing computer hardware and software and modern telecommunication technology, as well as skills in software engineering and cost analysis. Programming requirements are not anticipated for the data suppliers except those which are necessary to maintain their own files.

Effort during this task will also include a test plan for evaluation of the quality and performance capabilities of the overall system design.

4.2 OPERATE THE PROTOTYPE SYSTEM (TASK II-B).

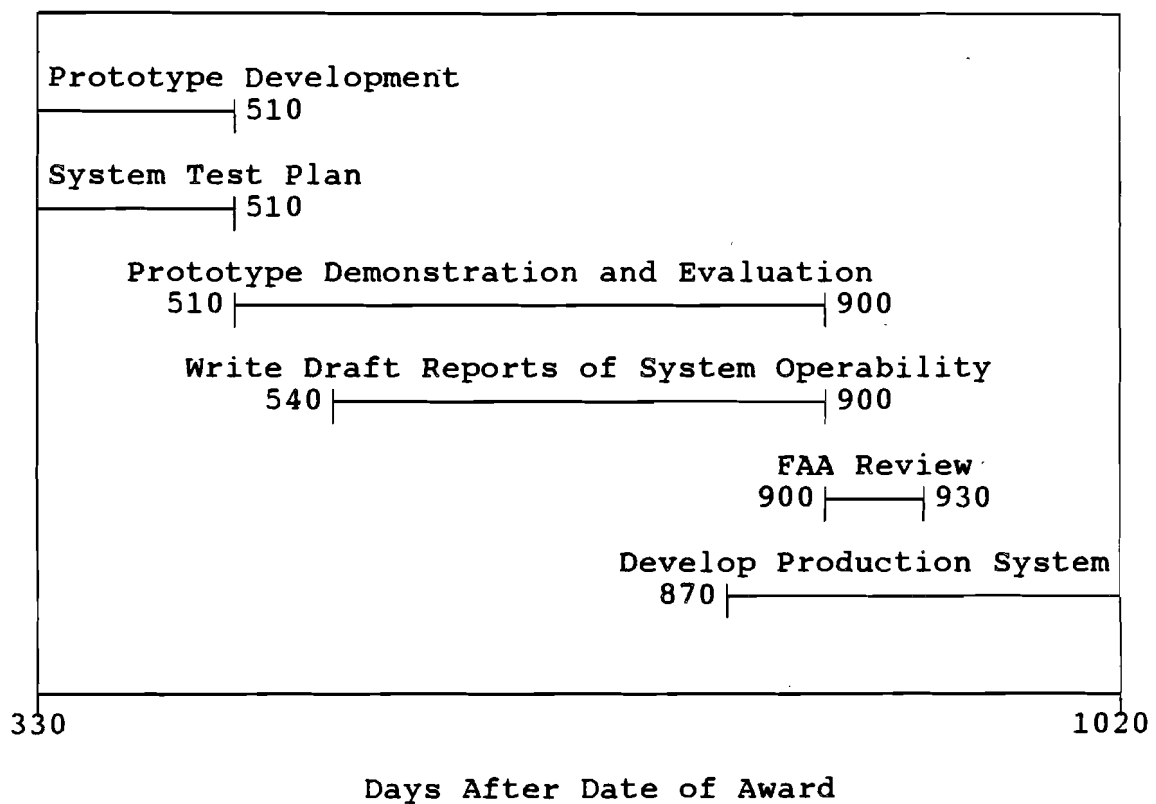
Once the prototype system is developed and run internally the system will be operated for a period of 12 months. This period will permit system testing as well as any adjustments which must be made. A report will be submitted to the FAA describing these tests. The final 90 days of the contract will be devoted to transforming the prototype system (with the approved modifications) into a production operator data base system. As the system development progresses to completion, plans will be made to bring the prototype system into operation. Results will be included in the final report, which will also include recommendations for improved operation and justification criteria for an operational system.

The level of automation of the prototype system will depend on the recommendations in the Master Plan. A complete record will be kept of how the system is used and the difficulties encountered. This information will be included in the report of system operation results. Finally, this task will result in an operational working system that is available and ready for delivery along with all other nonexpendables purchased during this contract.

4.3 SCHEDULE.

Phase II Schedule

23-Month Program



5. PROGRAM SCHEDULE.

The months of October and November were devoted to locating potential aircraft operator data, creating the specifications for operator data, and beginning to determine the needs of the FAA for aircraft operator data.

In December subcontracts will be awarded to the aircraft operator data suppliers. When these subcontracts are in place, an examination of the data will begin. The initial emphasis will be on the coverage of the aviation universe and on the way that the data are physically organized. The networks of both the data suppliers and the FAA will be evaluated in preparation for later communication system development. Once a subcontractor for the feasibility demonstration is selected, methods for operating the feasibility demonstration and creating and maintaining the data logs will be developed.

In January the completeness of the data will be determined and data gaps identified. The feasibility demonstration will be operated and the logs analyzed to obtain further information about the FAA's need for operator data. A preliminary definition of the data base design will be created, and a determination will be made to determine whether existing FAA software can be used or adapted, or whether other off-the-shelf software can be used, or if totally new software must be written.

In February the questions of data accuracy, integrity, and update cycles will be addressed. Selected users of the feasibility demonstration will be interviewed to record their experiences with the accuracy of the data. In addition, a systematic and controlled statistical analysis will be carried out on a data sample to obtain an objective measure of the data accuracy. This analysis will be carried out for both the Task 1 and Task 2 data suppliers. Once an initial design and type of data base has been determined, a system of updates and security will be developed. The operation of the feasibility study and examination of the logs will continue.

In March a variety of questions about the data will be addressed:

1. Are data collection methods consistent with accepted standards?
2. If the subcontractor starts out with government data, what is the value added by the subcontractor?
3. What are the propriety issues of using private data for critical governmental purposes?
4. Does the subcontractor have good potential as a data supplier for a long-term FAA program?

Also during March the feasibility study will continue and systems will be developed for the communications, backup, data integrity, and the general operation of the prototype aircraft operator data base.

In April the problems of protecting the propriety rights of the vendor's data will be addressed, as well as the problems associated with complying with governmental regulations. Based on all of the information obtained from the FAA and the feasibility demonstration log, the needs of the FAA for aircraft operator data will be defined. Finally, the prototype system will be defined and the first draft of the Master Plan will be prepared and delivered.

In May more work on solutions to the problems identified in earlier months will be accomplished and the first draft of the report on existing data will be prepared.

In June the final report on the Master Plan will be prepared. If it appears advisable that Phase II of this program be carried out, this final report will be followed by a program plan and budget for Phase II. The final report on the evaluation of the existing data bases will be prepared in July.

PROGRAM PLAN

INTERNATIONAL AIRCRAFT OPERATOR DATABASE

November 1989

MO.	ADMINISTRATION	EXISTING DATA	FEASIBILITY DEMO	MASTERPLAN
OCT	Briefing.	Location of data sources.	Subcontractor specifications and RFP.	Determination of FAA needs and users.
NOV	Program plan.	Location of data sources.	Answer inquiries. Evaluate proposals.	Determination of FAA needs and users.
DEC	Make award. to subcontractor.	Evaluate data. and formats.	Operate feasibility demonstration.	Evaluate formats and networks of vendors & FAA.
JAN		Find data gaps.	Operate feasibility demonstration.	Evaluate logs. Evaluate systems database equipment, & alternatives.
FEB		Evaluate accuracy, update cycles, data integrity.	Operate feasibility demonstration.	Evaluate logs. Design updates & security system.
MAR		Evaluate collection methods, potential, ease of use, value added, & propriety of private use.	Operate feasibility demonstration.	Evaluate logs. Design systems for communications, backup, integrity, and operations.
APR	<i>Draft report of masterplan.</i>	Problems with proprietary data & gov. requirements.	Operate feasibility demonstration.	Define FAA needs. Define system. <i>Draft report.</i>
MAY	<i>Draft report of existing databases.</i>	Solutions and options. <i>Draft report.</i>	Operate feasibility demonstration.	FAA review.
JUN	<i>Final report masterplan.</i>	FAA review.		<i>Final report.</i>
JUL	<i>Final report of existing databases.</i>	<i>Final report.</i>		

Deliverables in italics

6. PROGRAM MANAGEMENT.

Name and Title	Responsibility
Gary Frings FAA Program Manager	Overall FAA Program Management
Dr. John J. Hutchinson Program Director	Overall WSU Program Direction FAA Coordination
Frank Macheers Project Manager	Program Administration Research Existing Data
Gary Ott Systems Manager	Computer System Development Communications
Raj Sunderraman Computer Scientist	Theoretical Database Design
John Ellis Sr. Systems Analyst	Systems Integration Communications

An overview of the program management structure is shown in figure 1. The FAA Technical Center's Aviation Safety Division (ACD-200), Flight Safety Research Branch Program Manager (ACD-230) provides overall program development, co-ordination, and implementation continuity. The FAA's Aviation Standards National Field Office Regulatory Support Division (AVN-100), Engineering and Manufacturing Branch (AVN-110), is the end-user of the International Aircraft Operator Data Base.

7. REFERENCE.

1. Contract Award for International Aircraft Operators Database, Contract No. DTFA03-89-C-00057, FAA Technical Center, September 29, 1989.

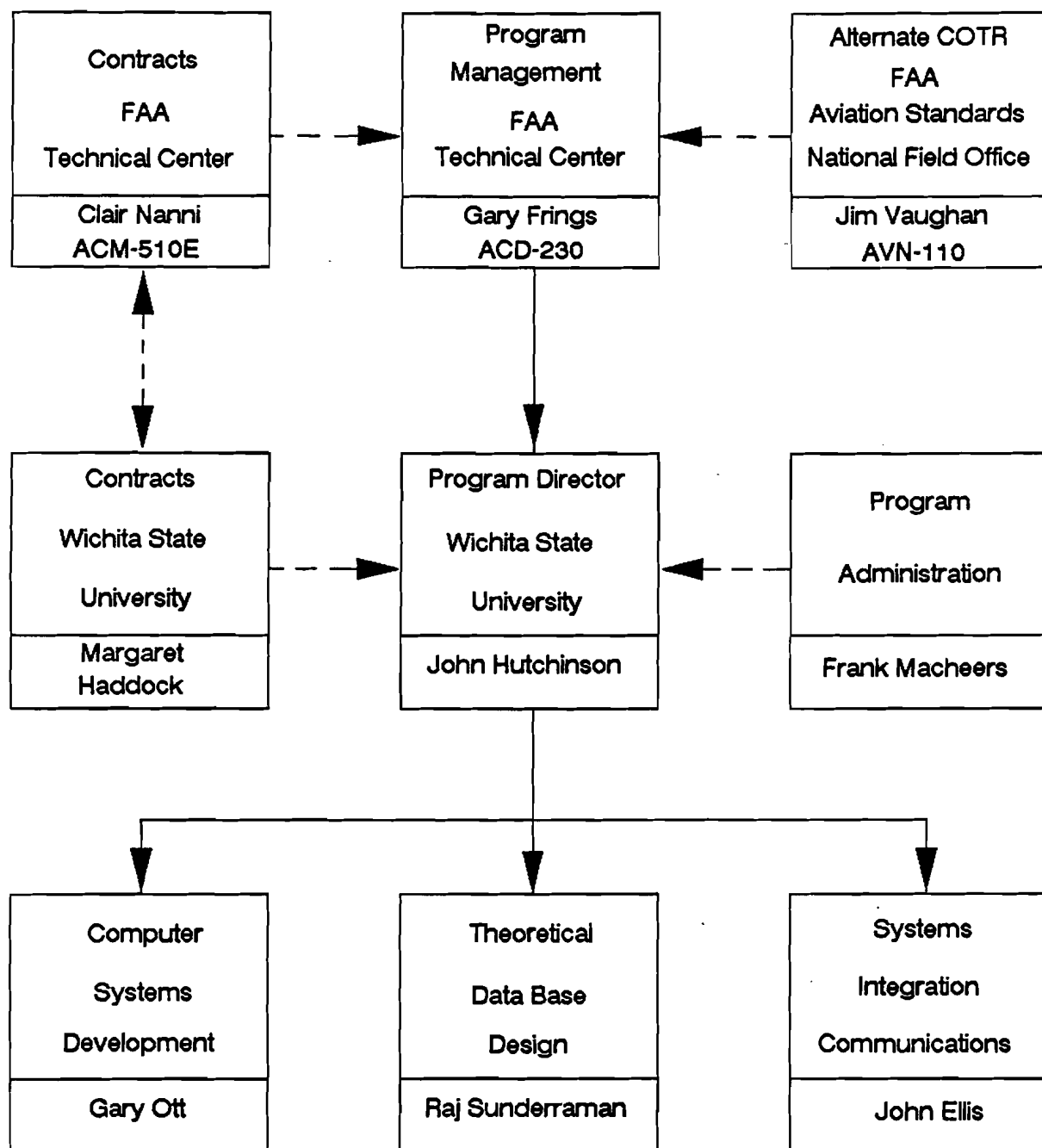


FIGURE 1. PROGRAM MANAGEMENT