Institute of Transportation Studies
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**A FIVE-YEAR DEVELOPMENT PLAN FOR THE
CALIFORNIA AVIATION DATABASE**

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WORKING PAPER
UCB-ITS-WP-99-2

Preface and Acknowledgments

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A FIVE-YEAR DEVELOPMENT PLAN FOR THE CALIFORNIA AVIATION DATABASE: 7/1997 - 6/2002

(1) INTRODUCTION:

The California Aviation Database (CAvD) project was suggested by Caltrans Aeronautics Program to fulfill a need of the planners involved in aviation system planning and programming activities to *locate* and *access* aviation data and information in an *efficient* and *comprehensive* way. CAvD is being implemented in the form of an Internet website and is currently intended as a five-year project. However, the development can be accelerated, and the duration will depend on the available resources. CAvD is a joint project between the National Center of Excellence for Aviation Operations Research (NEXTOR) and the California Department of Transportation (Caltrans). Its primary audiences include Caltrans and other State, regional, county, city and airport agencies. In this document, the CAvD database and CAvD Internet website are considered synonymous and will be used interchangeably.

This report first proposes a set of primary audiences and objectives for CAvD and a structure for the information to be posted on the mature CAvD website. It then proposes a set of information contents and a preliminary five-year development plan, with 7/97 - 6/98 as the base year. The preliminary plan proposed in this draft report is intended to be used as a starting point for the planning process for the five-year development, and will be revised according to Caltrans' needs and comments.

Rather than including all candidate data types in detail for possible inclusion in the five years, we propose to include (i) those data that have been regarded as important by most of the participants in the California Aviation Database User Needs Survey conducted last year, (ii) those data types that were not included in the questionnaire but were requested by the Survey respondents, and (iii) some important data types that were neither included in the Survey questions nor requested by the respondents. The reader is referred to "California Aviation Database: Data Needs and Availability" recently authored by Geoffrey Gosling for the Survey results. Table 2 of that document summarizes the Survey results while Table 3 states the additional data types requested by the respondents. We include both Tables in Appendix A and B, respectively.

Data types specified in four out of the seven Survey data categories are included in the draft five-year development plan, namely FAA Airport System Data, California Airport Data, MPO/RTPA Planning Data and State/Regional Aviation Planning Studies (Bibliographical listing). Nineteen different additional data types were requested by the Survey respondents; on-line access to National Flight Data Center Airport/Facilities Directory was also requested. All of the nineteen requested data types are also included in the current development plan. The

requested on-line access will also be supported by the CAvD website. For convenience of discussion, the California Aviation Database User Needs Survey will be referred to as the User Needs Survey or simply as the Survey in the rest of this document.

Data types are specified at different detail levels, depending on data availability and our preliminary assessment of their importance to the planners. Rather than including a rigid five-year schedule in the development plan, we propose to determine CAvD's actual information contents and the associated schedule in a more dynamic or adaptive way. Ample opportunities will be provided to Caltrans and the website visitors to make comments about the website and to suggest data for future inclusion. Both the proposed structure and the proposed information types will be revised according to Caltrans' and visitors' suggestions. Because of the dynamic and adaptive nature of this project, this report will be updated periodically and should be considered a "living document" until the project's completion.

The rest of this document is organized as follows. Section 2 proposes a set of target audiences and the resulting development objectives for CAvD. Section 3 briefly reviews a framework designed to organize the database and hence the website. Section 4 proposes a structure for the mature website (when the development of the database is completed at the end of the five years), e.g., how the information is partitioned into different webpages, linkage among those pages, and where linkages to other websites should take place. A set of proposed information contents and a preliminary five-year development plan are summarized in Section 5. Some CAvD development issues are discussed in Section 6. Appendices A and B provide a summary of the results of the User Needs Survey.

(2) PRIMARY AUDIENCES AND OBJECTIVES OF CALIFORNIA AVIATION DATABASE

We propose that the primary audiences and the corresponding objectives include:

State and regional transportation planning agencies in California: The CAvD website serves as the first-stop website, rather than "one-stop," for the planners. (This scope is different from what was proposed originally.) The reason why this website should not be a "one-stop" website is at least three-fold. First, many airport authorities provide their own websites, and this website is not intended to compete with theirs. Rather, this website is intended to complement and supplement theirs with a particular emphasis on a *systems* view of the California Aviation System. Second, a tremendous amount of data of potential interest to the planners exist in the form of CDs that have been marketed by private companies (based on data collected by the US DOT). It is doubtful that the Institute of Transportation Studies or Caltrans will be allowed to provide on-line-search capability at this website using such commercial CDs real-time. However, we expect to be able to legally provide some pre-run data sets (based on these CDs) of particular interest to the planners. Third, much existing literature exists only in the form of hardcopy

reports, journal articles and books. This website will only be able to provide bibliographical listings, and the visitor will need to obtain the listed material through other means.

Aviation planners of airport authorities: Since airport authorities in general collect and maintain detailed information about their own operations, their planners are unlikely to look to this website for information regarding their own airports. When they need detailed information about other airports, they may likely choose to visit the websites of those airports (if such websites do exist and the information being sought is provided at the sites). This leads to the need to identify what California airport authorities intend to include or not include in their websites. CAvD should provide information that cannot be found on individual airports' websites but is of interest to other planners at other airports. This website can also repeat information presented on individual airports' websites, but there must be value added, particularly in the form of contrasting situations at different airports or providing a single source for some important information regarding multiple California airports that is commonly or frequently needed.

Other audiences include those in aviation research, development and consulting communities that are interested in California' aviation system, aviation planners of other states, students, and those in the general public. We will work with Caltrans to determine the primary audiences and corresponding objectives. Website users will be asked to describe their needs and their professions. The primary audiences and the website objectives may evolve. However, as stated earlier, the primary goal of CAvD is to *locate* and *access* aviation data and information in an *efficient* and *comprehensive* way

Currently, NEXTOR has five public-sector partners on the West Coast. They are Caltrans, Los Angeles World Airports, Port of Oakland (Oakland International Airport), San Francisco International Airport, and Southern California Association of Governments (SCAG). Their needs will be solicited at the outset of this five-year development effort and throughout the five years. In fact, the entire concept of CAvD will not succeed without active participation of these agencies.

CAvD is also intended to support possible future aviation research projects that NEXTOR or its West-Coast public-sector partners foresee. It will also be a repository of the resulting research findings.

(3) A FRAMEWORK TO GUIDE THE STRUCTURING OF THE WEBSITE

To guide the five-year development of the website, it is desirable to have a guiding framework. Such a framework is briefly summarized as follows. (The framework will be revised according to Caltrans' comments and subject to possible further study. As CAvD grows and user needs become clearer, the framework may evolve.)

The framework has three dimensions: jurisdiction, function and time.

(3.1) Jurisdiction:

 Major different jurisdiction levels include:

- airport authority (county or city governments)
- regional government
- State government
- Federal government
- Private sectors

We assume that major California airports are operated by county or city governments and that both county and city perspectives are reflected by the corresponding airport authorities.

(3.2) Function:

We partition our discussion of various functions according to the jurisdiction.

Airport Planning Functions: Main functions of airport authorities include:

- Airport Demand Analysis
- Airport Capacity Analysis
- Airport Environmental Impact Analysis
- Airport Safety and Security Analysis
- Airport Operations
- Airport Economic Impact Analysis
- Airport and Airspace System Performance Evaluation
- Improving Airport Performance
- Others: Policy Making, Funding, etc.

The rationale of this categorization is as follows. In the context of airport activities, operations can be viewed as utilization of capacity to satisfy demand, subject to safety/security and environmental constraints. This motivated the first five categories. An airport exists in the larger context of local, regional and state economies, and the benefit of an airport is often gauged in terms of the mobility or the economic activities it provides or facilitates. This motivated the category of airport economic impact analysis. Since the performance of an airport also depends on that of other airports as well as that of the airspace, e.g., delay and airspace safety, this category complements the previous categories by bringing in relevant system performance measures. This motivated the category of airport and airspace system performance evaluation. With a clear understanding of the performance of the airport as well as relevant airspace, a primary function of airport planners is to improve airport performance. This motivated the

category of improving airport performance. The last category is meant to capture the rest of the major planning functions of an airport authority.

This method of categorizing airport planning functions will be used *repeatedly throughout* the database to categorize regional as well as statewide planning functions. This method is characterized by the process of (I) first understanding *operations* (as utilizing available capacity to satisfy demand, subject to safety/security and environmental constraints), (ii) evaluating the *performance* of operations in terms of operational efficiency, economic impact and other airport and airspace system performance measures, and (iii) then *improving* the performance. This process leads to the first eight categories listed above.

For ease of discussion, we will refer to these eight categories of functions the "operations-performance-improvement construct." This fundamental eight-category construct has been applied to airport planning functions, regional aviation planning functions, statewide aviation planning functions, and even the ground access planning functions. (Ground access planning functions are a subset of regional aviation system planning functions.)

Moreover, some "subfunctions" will also be categorized according to this fundamental construct. For example, the subcategory of "Candidate Solutions" under the category of "Improving Airport System Improvement" consists of six functional areas, namely demand management, capacity expansion, environmental mitigation and conformity, safety and security improvement, improving operational efficiency and improving economic impact. These six areas correspond exactly to the first six categories of the operations-performance-improvement construct, i.e., the first six categories of Airport Planning Functions.

Since the primary audience is the aviation planning community in the State, our focus will be on information that can facilitate the functions of the relevant aviation planners. Although some of the functions listed above are not exactly planning functions, e.g., airport operations, we will refer to these functions as aviation planning functions for convenience.

The fundamental construct is consistent with the 1998 California Transportation Plan (CTP), which calls for focused attention on performance measures and goods movement. Performance measures and measuring performance play a pivotal role in the eight-dimensional construct. As will become clear later, provision of information on air cargo movement will be treated as equally important as that on passenger movement. Performance measures and methods of measuring the performance developed under the larger effort by the State on 1998 CTP will be used throughout the development of CAvD. CAvD development effort may also produce such measures or methods. In such cases, they will be shared at an early stage with the larger 1998 CTP effort, and we will see to it that CAvD will use a set of measures and methods that are consistent with those chosen to implement 1998 CTP.

Regional-Agency Planning Functions: In addition to monitoring and contributing to the airport functions listed above, main functions of regional agencies also include:

- Same as those for airports, but with a focus on the region
- Facilitation and provision of ground access
- Land Use Planning
- Inter-airport facilitation and coordination

State Functions: In addition to monitoring and contributing to the airport and regional agency functions, main functions of State agencies also include:

- Same as those for airports and regional agencies, but with a focus on the State
- Provision and facilitation of ground access (Caltrans is in charge of the State's highway system.)
- Provision of inter-regional transportation infrastructure (highway, and possible high-speed rail)
- Inter-regional and inter-airport facilitation and coordination, and
- .

Federal Functions: In addition to monitoring and facilitating the airport, regional agency and state functions discussed above, the federal government fulfills many important functions. Examples include:

- Federal Inspection Services (Customs/Immigration)
- Airspace regulations, enforcement, planning, implementation, and operations
- Safety/security regulations, enforcement, research and development
- Noise regulations and enforcement

Private-sector Functions: Private sectors fulfill many functions. Examples include:

- Research, develop, and manufacture aviation equipment
- operate aviation equipment and provide services.

Private sectors may also serve what are commonly considered as or have traditionally been public-sector functions. For example, some airports are privately owned and operated. Recently, privatization of airports has received much research attention, and has actually occurred in some foreign countries. Other functions exist. For example, many universities are engaged in aviation research, in addition to educating future aviation professionals.

(3.3) Time:

Although the time dimension seems obvious, it reminds us that, in order to forecast the future, one needs to understand the current status well. This helps us prioritize data research and posting. Many possible time frames exist.

For ease of discussion, we refer to the framework defined above as jurisdiction-function framework. Explicit reference to the dimension of time will be dropped in later discussions for brevity.

4) THE PLANNED STRUCTURE OF THE MATURE WEBSITE

Based on the "jurisdiction-function framework," this section proposes a website structure. We focus on the "logical" organization of the website information and do not address the physical implementation.

The website begins with a homepage (i.e., CAvD Home Page), on which fifteen different major aviation planning function categories will be listed. At the end of this home page, the visitor will be provided with a further branch of three choices: Related Websites, Bibliographical Listings, and Visitor Suggestion Box. If and when the collection of bibliographical listings becomes too large to scroll through, a search capability will be added.

Information beyond CAvD Home Page will be partitioned into fifteen different branches, where each branch contains all the information relevant to the corresponding function category. Each branch will have a Branch Page, which specifies the information contents of the branch, i.e., the Table of Contents. Similar to the CAvD Home Page, at the end of each Branch Page, the visitor will be provided with a further branch of three choices: Related Websites, Bibliographical Listings and Visitor Suggestion Box. However, only those webpages and listings that are relevant to the particular branch are included. When the table of contents on a Branch Page grows to become too large to scroll through quickly, further branching may be implemented.

The actual data will be presented as tables, figures or charts, and will be presented on "Data Pages." These Data Pages will be linked to the Table of Contents provided on the corresponding Branch Page. The title of a Data Page will appear on the Branch Page and will be underscored for the visitor to click on. Data Sources and their important limitations will also be noted. Data will be collected and presented for calendar years to the extent possible. However, some federal data sources, e.g., Terminal Area Forecasts (TAF), report or disseminate data based only on the federal fiscal year, i.e., from October to September.

Ample opportunities will be given to Caltrans and the visitor to make comments and suggest data for future inclusion. This is achieved by soliciting feedback from Caltrans after each revision of this document and by providing a VISITOR SUGGESTION BOX on the CAvD Homepage and each of the fifteen Branch Page. Frequencies of visits to individual Branch Pages as well as Data Pages will be tracked. These will guide our future development of the website.

(5) INFORMATION CONTENTS OF THE MATURE WEBSITE AND A FIVE-YEAR DEVELOPMENT PLAN

In this section, we summarize the information contents for CAvD Home Page and each of the fifteen Branch Pages defined in Section 4. The time interval stated after the title of each Page signifies the period in which the specific data would be posted on the web for the first time, not the period for which the data will be posted on the website. The data will be updated after initial

posting.   Figure 1, located after the description of CAvD Homepage below, summarizes the five-year development plan.

As discussed earlier, the structure of the Website information adheres to the jurisdiction-function framework. The relevance of the data (proposed for inclusion) to the User Needs Survey will be addressed at the beginning of each of the eleven Branch Pages. However, many data types planned for inclusion were not included in the User Needs Survey.   Their desirability will be determined in due course.

More importantly, much of the information is not available and will have to be developed by NEXTOR, Caltrans or the individual airports. The resource requirements for the development and the maintenance of the database as well as for continuously updating the database depend upon the scope and depth of data inclusion. Therefore, the scope and depth of the database will have to be determined based on the resources planned by Caltrans for the development, maintenance and updating, NEXTOR will revise this five-year development plan to specify concrete scopes and depth levels as Caltrans' future budget plans regarding this development effort are developed in due course.

The ITMS database developed by Caltrans focuses on transportation modes other than air transportation. The air cargo information envisioned in the development plan can help ITMS developers enhance the database and eventually develop a truly intermodal freight movement database.

CAvD HOME PAGE *(7/97 - 6/98)*

- Primary audiences and objectives
- Five-year development plan
- Organization of this website
- Miscellaneous Notes

    (1) Airport Demand Analysis

    (2) Airport Capacity Analysis

    (3) Airport Environmental Impact Analysis

    (4) Airport Safety and Security Analysis

    (5) Airport Operations

    (6) Airport Economic Impact Analysis

    (7) Airport and Airspace System Performance Evaluation

(8) Improving Airport System Performance

(9) Other Airport Planning Functions: Policy Making, Funding, etc.

(10) Regional Ground Access

(11) Regional Airport Land Use Planning

(12) Inter-airport Relationships and Regional Aviation System Planning

(13) Multi-regional and Statewide Aviation System Planning

(14) Additional Federal Roles in California Aviation System

(15) Private-Sector Roles and Other Relevant Functions

RELATED WEBSITES
BIBLIOGRAPHICAL LISTINGS
VISITOR SUGGESTION BOX

Note that the first eight categories form the operations-performance-improvement construct, which will be used repeatedly throughout CAvD. The first nine categories address functions under the jurisdiction of an airport authority; the following four categories (from Category 10 through Category 13) address those under the jurisdiction of regional and State agencies; the last two categories deal with federal and private-sector roles.

Figure 1. A Preliminary Five-year CAvD Development Plan

Functions	year 1 (97-98)	year 2 (98-99)	year 3 (99-00)	year 4 (00-01)	year 5 (01-02)
Airport Demand					
Airport Capacity					
Airport Environ. Impact					
Airport Safety and Security					
Airport Operations		TBD	TBD	TBD	TBD
Airport Economic Impact					
Airport and Airspace Perf.		delay	safety		
Airport Improvement					
Other Airport Functions					
Regional Ground Access		TBD	TBD	TBD	TBD
Regional Land Use		TBD	TBD	TBD	TBD

Regional Aviation Planning		TBD	TBD	TBD	TBD
State Aviation Planning		TBD	TBD	TBD	TBD
Additional Federal Roles		TBD	TBD	TBD	TBD
Private Roles and Others					

BRANCH PAGE 1: **Airport Demand Analysis** (7/98 - 6/99)

This branch contains airport demand information and analysis results. With respect to the Data Elements explicitly stated on the User Needs Survey (summarized in the Appendix), this branch contains or provides access to the FAA Airport System Data (including Airport Characteristics and Airport Traffic data) and part (a) of the California Airport Data (i.e.,, Monthly Traffic Reports).

A linkage to National Flight Data Center Airport/Facilities Directory (i.e., the FAA's Internet website containing the Terminal Area Forecasts traffic database) will be provided, as requested by User Needs Survey respondents.

Data in this branch will be organized as follows.

- Passenger
    - Airside
        - Measures
        - Demand Related Data
        - Factors Affecting Demand
        - Demand And Traffic: Modeling And Forecasting
    - Landside
- Cargo
    - multi-modal domestic freight origin/destination data, including air freight
    - multi-modal international trade data, including air freight
- GA and Others
- Take-Off And Landing Operations

RELATED WEBSITES

BIBLIOGRAPHICAL LISTINGS
VISITOR SUGGESTION BOX

Starting with the next branch page description, the three visitor options at the bottom of each branch page, namely the Related Websites, Bibliographical Listings and Visitor Suggestion Box, will be omitted, for brevity.

BRANCH PAGE 2:   **Airport Capacity Analysis** (7/00 - 6/01*)*

This branch contains airport capacity information and analysis results. With respect to the Data Elements explicitly stated on the User Needs Survey (summarized in the Appendix), the information relates to part (a) of the FAA Airport System Data.

- Passenger
  - Airside
    - Measures
    - Capacity Related Data
    - Factors Affecting Capacity
    - Capacity Modeling, Estimation And Requirements
  - Landside
- Cargo
- GA and Others
- Take-off and Landing Operations

BRANCH PAGE 3: **Airport Environmental Impact Analysis** (7/99 - 6/00*)*

This branch contains information about airport environmental impacts and analysis results. The information is organized as follows.

- Air Pollution
  - Laws And Regulations
  - Jurisdiction And Litigation
  - Measures
  - Analysis Methodology And Assessment Techniques
  - Impact Assessment
- Noise
  - Laws And Regulations
  - Jurisdiction And Litigation
  - Measures

- Analysis Methodology And Assessment Techniques
- Impact Assessment
- Ground Pollution
  - Laws And Regulations
  - Jurisdiction And Litigation
  - Measures
  - Analysis Methodology And Assessment Techniques
  - Impact Assessment
- Others

BRANCH PAGE 4: **Airport Safety and Security Analysis** (7/99 - 6/00)

This branch contains information about airport safety and security, which is organized as follows.

- Airport Safety
  - Performance Measures
  - Incidents And Accidents Impacting Safety Of An Airport And Surrounding Areas
    - Airside
    - Landside
    - Terminal Airspace
    - Off-Airport
  - Airport Safety Measures
  - Airport Safety Research
- Security
  - Performance Measures
  - Security Breaches
  - Security Measures
  - Security Research and Development

- Security Device Development and Deployment

BRANCH PAGE 5: **Airport Operations** (schedule TBD)

This branch contains information about airport operations. The information is organized as follows.

- Passenger Terminal Operations and Performance Measures
    - Airport Access and Intermodal Operations
        - Curbside
        - Parking
        - Public Transit
    - Airline Operations
        - Ticket and Check-in Counters
        - Luggage Transportation
    - Passenger Facilities
    - Concession Operations
    - Gate Assignment (by Airport Authority)
- Cargo Terminal Operations and Performance Measures
    - Ground Access and Intermodal Operations
    - Terminal Operations
- GA and Other Operations and Performance Measures
- Air Traffic Control Operations and Performance Measures

BRANCH PAGE 6: **Airport Economic Impact Analysis** (7/99 - 6/00)

This branch contains information about airport economic impacts. Information regarding economic impact data requested by respondents of the User Needs Survey is included in this branch. The information is organized as follows.

- Jobs, Personal Income, Revenue, And Taxes Generated by an Airport

- Economic Value Of Passenger Traffic To Service And Manufacturing Industries

- Economic Value Of Passenger Traffic To Tourism

- Economic Value Of Cargo Traffic To Manufacturing And Service Industries

BRANCH PAGE 7: **Airport and Airspace System Performance Evaluation** (7/98 - 6/99; 7/00 - 6/01)

This branch contains information about airport and airspace system performance. With respect to the Data Elements explicitly stated on the User Needs Survey (summarized in the Appendix), the information related to part (c) of California Airport Data (i.e., Air Passenger Survey Data) of the User Needs Survey is included or accessed in this branch. Information regarding Form 5010 and part 139 airport inspections requested by respondents of the User Needs Survey is also included in this branch. This branch of information is organized as follows.

- Delay (7/98 - 6/99)

  - Time Series For Average Delay Per Arriving Flight And For Average Delay Per Departing Flight

  - Time Series For The Standard Deviation Of Delay Of Arriving Flights And For The Standard Deviation Of Delay Of Departing Flights

  - Time Series For Median Delay Of Arriving Flights And For Median Delay Of Departing Flights

- Airspace Safety (7/99 - 6/00)

  - National Airspace System (NAS) Accidents

  - National Airspace System (NAS) Airspace Incidents

  - World Airport And Airspace Safety Information

- Other Performance Measures

  - Air Passenger Survey Data

BRANCH PAGE 8: Improving Airport System Performance (7/98 - 5/02)

This branch contains information regarding improving the performance of an airport. Research for and posting of data in this category will occur throughout the five years. The schedule will match that for the corresponding analysis. For example, information

regarding airport demand management will be researched and posted when information regarding airport demand analysis is researched and posted, which will occur during 7/98 - 6/99.

Currently, terminal airspace, i.e., airspace near an airport, is a major bottleneck of the National Airspace System (NAS). The Federal Aviation Administration of U.S. DOT has been conducting much research and development in an attempt to significantly increase the capacity of terminal airspace through the use of advanced technologies and modification of flight procedures. Information and data regarding the federal efforts on increasing terminal airspace capacity will also be included in this branch. However, similar efforts on increasing en-route airspace capacity will be addressed in the category of Additional Federal Roles in California Aviation System.

Information about (i) air quality and (ii) ground service equipment conversions to alternative fuel requested by some User Needs Survey respondents is included in the following data types, although implicitly.

- Needs Assessment

- Candidate solutions

    · Demand Management

    · Capacity expansion

    · Environmental mitigation and conformity

    · Safety and security improvement

    · improving operational efficiency

    · improving economic impact

- Evaluation of candidate solutions

Note that the six items under *Candidate Solutions* is consistent with the operations-performance-improvement construct and, more precisely, correspond to the first six categories of the construct.

BRANCH PAGE 9: Other Airport Planning Functions: Policy Making, Funding, etc. (7/98 - 6/02)

This branch is intended to capture important airport planning functions that are not included in the eight categories of the operations-performance-improvement construct. Note that data type of airport financial reports is part (d) of California Airport Data. Information regarding (i) type of airport accounting system, (ii) airport capital

improvement programs, (iii) funding sources for capital improvement projects, (iv) contribution from local tax sources in support of airports, (v) sales of avgas and jet fuel, (vi) airport employment statistics and (vii) licensed mechanics and flight instructors requested by the respondents of the User Needs Survey is also included in this branch. This branch is organized as follows.

- Airport Mission Statements

- Airport Financial Reports

- Airport Employment Statistics

- Current And Historical Landing Fees

- General Aviation Tie-Down And Hanger Fees

- Type Of Airport Accounting System

- Airport Master Plan Updates (Airport Capital Improvement Programs)

- Funding Sources For Capital Improvement Projects (Including Contribution From Local Tax Sources In Support Of Airports And Sales Of Avgas And Jet Fuel)

- Regional Planning Agency Aviation-Related Mission Statements

- State Government Aviation-Related Mission Statements

- Licensed Mechanics And Flight Instructors

- Based Aircraft by Type.

BRANCH PAGE 10: Regional Ground Access (schedule TBD)

This and the following three branches contain information related to regional and Statewide aviation system planning. This branch focuses on regional ground access to an airport. Data types for possible inclusion are as follows. All three parts of the MPO/RTPA Planning Data of the User Needs Survey (including Air Passenger Surveys, Air Cargo truck Surveys and Regional Travel Time Data) and part (b) of the California Airport Data (i.e., Ground Transportation Statistics) are included in this branch. This branch is organized as follows.

- Demand Analysis

- Capacity Analysis

- Environmental Impact Analysis

- Safety Analysis

- Operational Efficiency
  - Air Passenger Surveys
  - Air Cargo Truck Surveys
  - Regional Travel Time Data
- Needs For Improvement
- Candidate Solutions
  - Intelligent Transportation Systems Technologies
  - Other solutions
- Solution Evaluation

Note that the information to be included in this Branch Page is categorized according to the eight-category operations-performance-improvement construct, i.e., in exactly the same way we use for categorizing airport planning functions.

BRANCH PAGE 11: Regional Airport Land Use Planning (schedule TBD)

This branch contains information about airport land use planning, which is organized as follows.

- Airport Land Use Compatibility Issues
  - Safety
  - Noise
  - Air Quality
- Airport Land Use Guidelines
- Airport Land Use Legislation
- Airport Land Use Commissions (ALUCs)
- Effectiveness of Airport Land Use Planning
- Airport Land Use Research

BRANCH PAGE 12: Inter-airport Relationships and Regional Aviation System Planning (schedule TBD)

This branch contains information about inter-airport relationships and regional aviation system planning, which is organized as follows.

- Inter-airport Relationships of a Multi-airport Region
  - Traffic Distribution
  - Traffic Redistribution
- Regional Aviation System Plans
- Regional Aviation Planning
  - Regional Demand Analysis
  - Regional Capacity Analysis
  - Regional Environmental Impact Analysis
  - Regional Safety Impact Analysis
  - Utilization Efficiency Of Air Services In The Region
  - Regional Economic Impact Analysis
  - Regional Airport And Airspace System Performance Evaluation
  - Improving Regional Aviation System Performance
  - Other Regional Aviation Planning Functions: Policy Making, Funding, Etc.

Note that the eight items under Regional Aviation Planning are exactly the operations-performance-improvement construct.

BRANCH PAGE 13: Multi-regional and Statewide Aviation Planning (schedule TBD)

This branch contains information about multi-regional and Statewide aviation system planning, which is organized as follows.

- Multi-regional and Statewide Aviation System Plans (Northern, Central, Southern, and California Aviation System Plans) and Capital Improvement Plans
- Multi-regional and Statewide Aviation Planning
  - Demand Analysis
  - Capacity Analysis
  - Environmental Impact Analysis
  - Safety and Security Impact Analysis

- Utilization Efficiency Of Air Services In The State

- Economic Impact Analysis

  - Role Of Passenger Air Transportation In State's People Movement And Economy

  - Role Of Air Cargo In California's Goods Movement And Economy

  - Role Of General Aviation In California's Economy

  - Current And Historical Air Fares

- Airport And Airspace System Performance Evaluation

- Improving California Aviation System Performance

- Other State Aviation Planning Functions: Policy Making, Funding, Etc.

- Inter-regional Relationships and Inter-regional Coordination

  - Multi-regional Traffic Distribution

  - Multi-regional Traffic Redistribution

- Other Modes of Inter-regional Transportation

  - Highway

  - Rail

  - High-Speed Rail

Note that the first eight items under Multi-regional and Statewide Aviation Planning are exactly the operations-performance-improvement construct.

BRANCH PAGE 14: Additional Federal Roles in California Aviation System (schedule TBD)

The federal government plays many critical roles in the Nation's aviation industry, many of which have been discussed in the context of previous function categories. Additional federal roles include:

- Airspace Regulations, Enforcement, Planning, Implementation, And Operations

- Safety And Security Regulations, Enforcement, Research And Development

- Noise Regulations And Enforcement

- Federal Capital Improvement Plans

- National Plan of Integrated Airport System.

BRANCH PAGE 15: Private-Sector Roles and Other Functions (7/98 - 6/99)

This branch contains information about private-sector roles as well as miscellaneous information related to airport, regional and State aviation planning. The information is tentatively organized as follows.

- Airframe Industry

- Avionics Industry

- Airline Industry

- Trade And Professional Associations

(6) SOME POTENTIAL ISSUES:

Potential issues for the proposed five-year development plan include the following.

- Possible Copyright Issues: Use of ONBOARD, which is an information product produced and marketed by a private data vendor (based on data collected by the FAA), for real-time on-line search on the planned CAvD website seems legally questionable.

- CAvD data may contain information that airports may consider offensive. For example, it will contain safety information. If a particular airport authority feels that the safety information posted on the CAvD website may leave the impression that the corresponding airport is among the most unsafe ones in the State or the Nation, it may object to the inclusion of such information. If included, it may invite resentment toward the website. A concrete example is as follows. A very recent airport safety report indicates that SFO is perceived by pilots as one of the most unsafe airports in the world because the two runways usually used for landing are too close together and aircraft sometimes align with the wrong runway during final approach. Although this could be a golden opportunity for the airport authority to convince the public that the recently proposed airport "reconfiguration" (i.e., replacing one of the two runways mentioned earlier with a new runway in the San Francisco Bay) would solve this safety problem, the airport authority expressed much displeasure or even outrage toward the report.   A major policy issue is whether we would post such information on the web. If so, do we need to provide "response" from the airport authority involved? Similar concerns may apply to the delay information.

- We expect to establish many links to California airports' websites. For example, a linkage to an airport website's discussion of its master plan updates will be made. However, to avoid a website visitor's need to view the airport's webpage from the very beginning and the need to search for the relevant website discussion, it would be good to establish a linkage directly to the webpage containing the discussion. To enable this, it would be good if the airport's website can be structured in such a way that its pages can be broken down according to aviation planning functions, preferably those functions that are defined similarly to those of CAvD.   This possibility may be worth some discussion during our next meeting with NEXTOR's West-Coast airport partners.

- Much information about aviation in California seems worth inclusion in CAvD. A significant amount of primary research is involved. When the primary research is completed and the website becomes mature, updating data on the website itself will likely be labor-intensive. Linkages to other websites will also need to be maintained or updated, which requires coordination with the other websites. The amount of resources required for maintenance depends on the amount of data to be included in CAvD.

- The role of performance measures has been accentuated throughout the database design. For example, for each of the eight primary airport planning functions, either one or more subcategories or the whole category is about performance measures. In fact, the operations-performance-improvement construct is predicated on the pivotal role of performance measures, and the construct has been used throughout the database. The database development effort is not only consistent with the 1998 California Transportation Plan (1998 CTP), whose two foci are performance measures and freight transportation, but also serves as a systematic effort to help implement the Plan. Concrete steps to complement, supplement or help implement the 1998 CTP efforts will be addressed as planning and programming of 1998 CTP occurs.

- Like performance measures, cargo also plays an pivotal role in the database. CAvD development effort will also complement the 1998 CTP implementation efforts, e.g., the updating of the ITMS database. The potential complementary relationship depends on several factors, e.g., the ITMS development agenda.

- Caltrans Aeronautics Program has recently received a grant from the FAA for organizing and converting its data into a relational database (RDB). CAvD development will complement that effort. The way CAvD information is organized, e.g., the operations-performance-improvement construct, may be considered as a way of organizing the relational database. More importantly, the organization of CAvD, e.g., the operations-performance-improvement construct, may evolve based on lessons learned from and innovations made by the RDB effort. Synergy with other possible related development efforts at Caltrans will also be investigated.

- Intelligent Transportation Systems (ITS) and other technologies may play a critical role in improving (passenger and cargo) airport ground access as well as intermodal operations, and the role has been explicitly stated in many categories. Examples include: the "Airport Access and Intermodal Operations" under the Subcategory of "Passenger Terminal Operations and Performance Measures" and "Ground Access and Intermodal Operations" under the Subcategory of "Cargo Terminal Operations and Performance Measures" on Branch Page 5 : Airport Operations; "Intelligent Transportation Systems Technologies" under the Subcategory of "Candidate Solutions" on Brach Page 10 - Regional Ground Access Planning. ITS technologies will also be important for a number of other tasks. To limit the level of categorization, such importance may not be explicitly stated. Examples include the "Capacity Expansion" and Improving Operational Efficiency" under the Subcategory of Candidate Solutions on Branch Page 8 - Improving Airport System Performance. Note that if ITS technologies are important for an airport- or regional-level function, it is also important for the same function at any higher jurisdiction level, e.g., Statewide aviation planning. For brevity, such importance has not be explicitly pointed out at the higher jurisdiction levels. The importance of ITS technologies cannot be exhaustively stated because of the high potential. For example, ITS technologies may also play an important role in airport parking

planning. Much research is needed in this area, and a credible assessment of the roles hinges upon the research findings.

- Air transportation is intermodal by nature, and Intermodal operations play a critical role in CAvD. This role is explicitly addressed in the context of both the passenger terminal and cargo terminal operations in the information category of Airport Operations. Assessing the role of intermodalism in improving airport operations requires much research. A pending research project entitled "Intermodal Operations for the Air Freight Industry through Intelligent Transportation Systems Technologies" is expected to produce a clear understanding of the roles of both intermodalism and ITS technologies and is also expected to suggest strategies to improve airport ground access and operations accordingly. We will use CAvD as a means to disseminate the expected findings.

- Finally, several issues about the development, ownership and liability remain and need to be addressed soon. They have been raised by Caltrans reviewers of earlier versions of this document, and include the following.

  - Is the maintenance of the database envisioned to be perpetually performed by the Institute of Transportation Studies at Berkeley; or are there other options for the future? Is the database something that Caltrans could maintain?

  - Who will "own" the website/database?

  - Who will take credit for the website/database? (Suggestion: Both Caltrans and NEXTOR take credit, e.g., NEXTOR for development and Caltrans for funding.)

  - Who has liability for the website/database information? (Suggestion: None.)

APPENDIX A: CAvD User Needs Survey Results (Table 2 of "California Aviation Database: Data Needs and Availability" authored by Geoffrey Gosling and dated March 22, 1999)

Table 1
User Needs Survey Results

Data Elements	Number of Responses *Usefulness Rating*					Mean Resp	Std Dev
	1	2	3	4	5		
1. FAA Airport System Data						**3.7**	
a) Airport characteristics	4	5	10	12	15	3.6	1.3
b) Airport traffic	2	6	10	13	15	3.7	1.2
2. FAA Aircraft and Airmen Data						**2.6**	
a) Registered aircraft	8	10	11	7	10	3.0	1.4
b) Licensed airmen	14	16	9	2	4	2.2	1.2
3. FAA Airspace/Navaid Data						**2.4**	
a) Navaid and fix location	14	10	11	5	6	2.5	1.4
b) Airways	15	11	13	4	3	2.3	1.2
c) SIDS/STARS	17	8	12	5	3	2.3	1.3
d) Airspace boundaries	14	8	11	8	5	2.6	1.4
4. US DOT Airline Data						**2.9**	
a) Form 41 financial data	11	12	12	5	6	2.6	1.3
b) T-100/T-3 traffic by flight segment	11	9	9	10	7	2.8	1.4
c) 10% origin-destination traffic	8	6	10	7	15	3.3	1.5
5. California Airport Data						**3.2**	
a) Monthly traffic reports	3	7	13	11	12	3.5	1.2
b) Ground transportation statistics	3	12	13	10	7	3.1	1.2
c) Air passenger survey data	3	8	11	9	15	3.5	1.3
d) Annual financial reports	7	16	12	4	6	2.7	1.2
6. MPO/RTPA Planning Data						**3.3**	
a) Air passenger surveys	2	7	11	11	14	3.6	1.2
b) Air cargo truck surveys	5	12	9	12	7	3.1	1.3
c) Regional travel time data	7	9	10	10	8	3.1	1.3
7. State/Regional Aviation Planning Studies						**3.2**	
Bibliographic listing	5	12	9	9	11	3.2	1.3

* SIDS/STARS stands for Standard Instrument Departures/Standard Terminal ARrivals.
** MPO/RTPA stands for Metropolitan Planning Organization/Regional Transportation Planning Agency.

APPENDIX B: Additional Data Types Requested by the CAvD Survey Respondents (Table 3 of "California Aviation Database: Data Needs and Availability" authored by Geoffrey Gosling and dated March 22, 1999.)

Table 2
Additional Data Requirements

1	Current and historical air fares
2	Current and historical landing fees
3	General aviation tie-down and hangar fees
4	Based aircraft by type
5	Airport Land Use Commission data
6	Air quality information
7	Ground service equipment conversions to alternative fuels
8	Status of surplus military base conversions
9	Form 5010 and Part 139 airport inspections
10	Licensed mechanics and flight instructors
11	Type of airport accounting system
12	Airport capital improvement program data
13	Federal and State Capital Improvement Plan data
14	National Plan of Integrated Airport Systems data
15	Funding sources for capital improvement projects
16	Contribution from local tax sources in support of airports
17	Airport employment statistics
18	Sales of avgas and jet fuel
19	Economic impact data
20	On-line access to National Flight Data Center Airport/Facilities Directory