Reference

REPORT NO. DOT-TSC-OST-72-34, SUPPLEMENT I

REPORTS BIBLIOGRAPHY
SUPPLEMENT 1
JANUARY-JUNE 1973
UNLIMITED-DISTRIBUTION REPORTS

Transportation Systems Center
Management Services Division
Information Services Branch
Kendall Square
Cambridge MA 02142

SEPTEMBER 1973

DOCUMENT IS AVAILABLE TO THE PUBLIC

Prepared for
DEPARTMENT OF TRANSPORTATION
OFFICE OF THE SECRETARY
Washington DC 20590

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1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
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4. Title and Subtitle	5. Report Date
REPORTS BIBLIOGRAPHY - SUPPLEMENT I UNLIMITED-DISTRIBUTION REPORTS	September 1973
	6. Performing Organization Code
7. Author(s)	8. Performing Organization Report No.
T.F. McDonough	DOT-TSC-OST-72-34 SUPPLEMENT I
9. Performing Organization Name and Address	10. Work Unit No.
Transportation Systems Center Management Services Division Information Services Branch Kendall Square, Cambridge MA 02142	G-2130
	11. Contract or Grant No.
12. Sponsoring Agency Name and Address	13. Type of Report and Period Covered
Department of Transportation Office of the Secretary Washington DC 20590	Reports Bibliography January-June 1973
	14. Sponsoring Agency Code

15. Supplementary Notes

16. Abstract

This publication supplements the "Reports Bibliography-December 1972," and provides a listing of all unlimited-distribution reports published by the Transportation Systems Center DOT from January through June 1973.

Reports available through the National Technical Information Service are listed. The reports are classified by sponsoring agency. A copy of the title page (which contains an abstract of the report) from each report is included.

17. Key Words	18. Distribution Statement
Bibliography Unlimited distribution	DOCUMENT IS AVAILABLE TO THE PUBLIC

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AVAILABILITY OF REPORTS

Reports listed in this bibliography with an "AD" number or a "PB" number are available from the National Technical Information Service, in either paper copy or microfiche. Prices can be obtained from the Government Reports Announcements.

NTIS
Springfield, Virginia, 22151

UNLIMITED-DISTRIBUTION REPORTS

FEDERAL AVIATION ADMINISTRATION

DOT-TSC-FAA-72-15/FAA-RD-72-96 AD749293
ILS Localizer Performance Study-Part 1: Dallas/Fort Worth Regional Airport and Model Validation - Syracuse Hancock Airport,
by C. Chin, L. Jordan, D. Kahn, S. Morin, and D. Newsom,
Final Report, July 1972

DOT-TSC-FAA-72-20/FAA-RD-72-109 AD752156
Preliminary Evaluation of Synthetic Speech,
by E. Hilborn,
Interim Report, August 1972

DOT-TSC-FAA-72-21/FAA-RD-72-101 AD758697
Advanced Computer Architecture for Large Scale Real-Time Applications
by G. Wang,
Final Report, April 1973

DOT-TSC-FAA-72-26/FAA-RD-72-142 AD757274
Oceanic Surveillance and Navigation Analysis, FY72,
by G. Gagne and R. Hershkowitz,
Final Report, March 1973

DOT-TSC-FAA-72-28/FAA-RD-72-137 AD754517
Instrument Landing System Scattering,
by G. Chin, L. Jordan, D. Kahn and S. Morin,
Final Report, December 1972

DOT-TSC-FAA-72-29/FAA-RD-73-24 AD758407
Signal Analysis for Aersat,
by L.A. Frasco,
Final Report, August 1972

DOT-TSC-FAA-72-30/FAA-RD-72-86 AD754892
Microwave Landing System Signal Requirements for Conventional Aircraft,
by M. Lanman, III,
Final Report, July 1972

DOT-TSC-FAA-72-31/FAA-RD-73-30 AD75780
A System of Sixteen Synchronous Satellites for Worldwide Navigation,
by J. Morrison,
Interim Report, March 1973

FEDERAL AVIATION ADMINISTRATION

DOT-TSC-FAA-72-32/FAA-RD-73-22 AD757744
O'Hare ASDE-2 Radome Performance in Rain; Analysis and Improvement,
by R. Weigand,
Final Report, March 1973

DOT-TSC-FAA-72-33 AD759082
Electrocardiogram Scanner, System Requirements,
by P. W. Davis, D. Ofsevit, and J. Lutz,
Final Report, April 1973

DOT-TSC-FAA-72-35/FAA-RD-73-39 AD758698
A Method for the Study of Category III Airborne Procedure Reliability,
by C. Feehrer,
Final Report, March 1973

DOT-TSC-FAA-72-37/FAA-RD-72-150 AD754273
Human Factors Experiments for Data Link: Interim Report I,
by E. Hilborn,
Interim Report, November 1972

DOT-TSC-FAA-72-38/FAA-RD-73-20 AD757074
Clear Air Turbulence Radiometric Detection Program,
by G. Wagner, G.G. Haroules, and W. E. Brown,
Final Report, March 1973

DOT-TSC-FAA-72-40/FAA-RD-73-16 AD758699
Controller-Reported Performance Defects in the Air Traffic Control Radar Beacon System (1971 Survey),
by B. Rubinger,
Final Report, March 1973

DOT-TSC-FAA-72-41/FAA-RD-72-128 AD755682
Microwave Scanning Beam Approach and Landing System Phased Array Antenna, (2 Volumes)
by R. Kalafus, G. J. Bishop, F. J. LaRussa, P. J. Pantano, W. R. Wade, and R. S. Yatsko,
Annual Report, April 1973

DOT-TSC-FAA-73-1/FAA-RD-73-6
A Preliminary Requirements Analysis for Airport Surface Traffic Control Systems,
by G. Baran, R. A. Bales, J. F. Koetsch, and R. E. Le Van
Interim Report, January 1973 (Contractor Report)

Unlimited-Distribution Reports

FEDERAL AVIATION ADMINISTRATION

DOT-TSC-FAA-73-3
Flight Plans: Stol Avionics Flight Test Program,
by L. Hyatt,
Preliminary Memorandum, April 1973 (Contractor Report)

DOT-TSC-FAA-73-6/FAA-RD-73-55 AD760401
Human Factors Experiments for Data Link
Interim Report No. 2,
by E. H. Hilborn,
Interim Report, April 1973

DOT-TSC-FAA-73-8/FAA-RD-73-75
Feasibility Analysis of an Air Traffic Control Radar Beacon System (ATCRBS) Based Surface Trilateraction Surveillance System,
by J. Vinatieri
Final Report, June 1973 (Contractor Report)

Unlimited-Distribution Reports

TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
FAA-RD-72-96		

4. Title and Subtitle	5. Report Date
ILS LOCALIZER PERFORMANCE STUDY - PART I DALLAS/FORT WORTH REGIONAL AIRPORT AND MODEL VALIDATION - SYRACUSE HANCOCK AIRPORT	July, 1972
	6. Performing Organization Code

7. Author(s)	8. Performing Organization Report No.
G. Chin, L. Jordan, D. Kahn, S. Morin and D. Newsom	DOT-TSC-FAA-72-15

9. Performing Organization Name and Address	10. Work Unit No.
Department of Transportation Transportation Systems Center 55 Broadway Cambridge, MA 02142	R-3117
	11. Contract or Grant No. FA207
	13. Type of Report and Period Covered Final Report July 1971-July 1972
12. Sponsoring Agency Name and Address Department of Transportation Federal Aviation Administration Systems Research and Development Service Washington, D.C. 20591	14. Sponsoring Agency Code

15. Supplementary Notes

16. Abstract

The TSC electromagnetic scattering model has been used to predict the course deviation indications (CDI) at the planned Dallas Fort Worth Regional Airport. The results show that the CDI due to scattering from the modeled airport structures are within Category I requirements on all four modeled runways when the capture effect localizer (Alford 1B) is used but only marginally acceptable when the standard V-Ring localizer is used. Category II requirements for the designated Category II runway are met only by the capture effect antenna.

The report also presents the results of the TSC validation test in which Syracuse Hancock Airport was modeled. Theoretical and flight recorded data were compared and good agreement was obtained.

17. Key Words	18. Distribution Statement
Dallas Fort Worth Regional Airport, Syracuse Hancock Airport, ILS, CDI, Electromagnetic Scattering, Localizer	DOCUMENT IS AVAILABLE TO THE PUBLIC THROUGH THE NATIONAL TECHNICAL INFORMATION SERVICE, SPRINGFIELD, VIRGINIA 22151

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
Unclassified	Unclassified	100	

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1. Report No. FAA-RD-72-109	2. Government Accession No.	3. Recipient's Catalog No.
4. Title and Subtitle PRELIMINARY EVALUATION OF SYNTHETIC SPEECH		5. Report Date August 1972 6. Performing Organization Code
7. Author(s) Edwin H. Hilborn		8. Performing Organization Report No. DOT-TSC-FAA-72-20
9. Performing Organization Name and Address Department of Transportation Transportation Systems Center 55 Broadway, Cambridge, MA 02142		10. Work Unit No. R2130 11. Contract or Grant No. FA213 13. Type of Report and Period Covered Interim Report
12. Sponsoring Agency Name and Address Department of Transportation Federal Aviation Administration Systems Research and Development Service Washington, D.C. 20591		14. Sponsoring Agency Code
15. Supplementary Notes		

16. Abstract

This report briefly discusses the methods for storing and generating synthetic speech and a preliminary evaluation of the intelligibility of a speech synthesizer having a 75-word vocabulary selected for air traffic control messages. A program is suggested for additional testing based upon a vocabulary expanded to 128 words.

17. Key Words	18. Distribution Statement		
Synthetic Speech, Air Traffic Control, Digital Data Link	DOCUMENT IS AVAILABLE TO THE PUBLIC THROUGH THE NATIONAL TECHNICAL INFORMATION SERVICE, SPRINGFIELD, VIRGINIA 22151.		
19. Security Classif. (of this report) Unclassified	20. Security Classif. (of this page) Unclassified	21. No. of Pages 22	22. Price

1. Report No. FAA-RD-72-101	2. Government Accession No	3 Recipient's Catalog No
4. Title and Subtitle ADVANCED COMPUTER ARCHITECTURE FOR LARGE-SCALE REAL-TIME APPLICATIONS		5 Report Date April 1973 6. Performing Organization Code
7. Author(s) Gary Y. Wang		8 Performing Organization Report No DOT-TSC-FAA-72- 21
9. Performing Organization Name and Address Department of Transportation Transportation Systems Center Kendall Square, Cambridge, MA. 02142		10 Work Unit No R-2101 11 Contract or Grant No FA203
12. Sponsoring Agency Name and Address Department of Transportation Federal Aviation Administration Systems Research and Development Service Washington, D.C. 20591		13 Type of Report and Period Covered Final Report 14 Sponsoring Agency Code
15 Supplementary Notes		

16 Abstract

In this study the air traffic control automation is identified as a crucial problem which provides a complex, real-time computer application environment. A novel computer architecture in the form of a pipeline associative processor is conceived to achieve greater performance improvement over the present air traffic control system by parallel processing. This new processor is structured into a multiprocessor configuration for reliability enhancement. Problems associated with multiprocessors are identified with special emphasis on execution time anomalies and memory conflict. A direct graph model is used for analysis from which simple heuristics are established for memory allocation and dynamic task scheduling to achieve optimal performance with minimal system overhead. These schemes are simulated and the results obtained follow closely the predicted system behavior

17. Key Words	18. Distribution Statement
Parallel Processor, Associative Processor, Multiprocessing, Memory Allocation, Dynamic Task Scheduling, Graph Modelling, Air Traffic, Real-Time Systems	DOCUMENT IS AVAILABLE TO THE PUBLIC THROUGH THE NATIONAL TECHNICAL INFORMATION SERVICE, SPRINGFIELD, VIRGINIA 22151.

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
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TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
FAA-RD-72-142		

4. Title and Subtitle	5. Report Date
OCEANIC SURVEILLANCE AND NAVIGATION ANALYSIS, FY72	August 1972
	6. Performing Organization Code
7. Author(s)	8. Performing Organization Report No.
Gilbert A Gagne, Ronald M. Hershkowitz	DOT-TSC-FAA-72-26
9. Performing Organization Name and Address Department of Transportation Transportation Systems Center Kendall Square Cambridge, MA 02142	10. Work Unit No. R3144 11. Contract or Grant No. FA204
12. Sponsoring Agency Name and Address Department of Transportation Federal Aviation Administration Systems Research and Development Service Washington, D.C. 20591	13. Type of Report and Period Covered Final Report 14. Sponsoring Agency Code

15. Supplementary Notes

16. Abstract

This report summarizes the Oceanic Surveillance and Navigation Analysis performed, at or under the direction of, the Transportation Systems Center under PPA FA-204 for FY72. A methodology has been developed by Systems Control, Inc. for relating the safety (collision risk) of the North Atlantic organized Track System in the lateral dimension to the general characteristics of the on-board navigation system, the independent satellite surveillance system and the ATC procedures. The initiation of this effort by TSC was reported in TR DOT-TSC-FAA-71-13. The analysis and results are detailed herein. Extensions of this methodology to the latitude and vertical dimensions are also discussed and preliminary results are presented. A study has also been initiated to investigate and evaluate various configurations of aided inertial navigation system in the NAT region. The requirements, goals and contract award for this study are reviewed.

March, 1973

17. Key Words	18. Distribution Statement
Air Traffic Control, Collision Risk Model, Hybrid - Inertial Navigation, Satellite Surveillance, Latitude, vertical, Longitudinal separation	DOCUMENT IS AVAILABLE TO THE PUBLIC THROUGH THE NATIONAL TECHNICAL INFORMATION SERVICE, SPRINGFIELD, VIRGINIA 22151.

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
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1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
FAA-RD-72-137		

4. Title and Subtitle	5. Report Date
INSTRUMENT LANDING SYSTEM SCATTERING	December 1972
	6. Performing Organization Code

7. Author(s)	8. Performing Organization Report No.
G. Chin, L. Jordan, D. Kahn , S. Morin	DOT-TSC-FAA-72-28

9. Performing Organization Name and Address	10. Work Unit No.
Department of Transportation Transportation Systems Center Kendall Square, Cambridge, MA. 02142	R 2103
	11. Contract or Grant No. FA207
	13. Type of Report and Period Covered: Final Report
12. Sponsoring Agency Name and Address Department of Transportation Federal Aviation Administration Systems Research and Development Service Washington, D.C. 20591	14. Sponsoring Agency Code

15. Supplementary Notes

16. Abstract

The construction of a mathematical model of the Instrument Landing System (ILS) multipath problem has been undertaken. This report presents the theoretical basis for such a model, and newly achieved developments in ILS model construction.

17. Key Words	18. Distribution Statement
ILS, scattering theory, current deviation indication, derogation, receiver model, Doppler Shift, DDM	Availability is Unlimited. Document may be Released to the National Technical Information Service, Springfield, Virginia 22151, for sale to the Public.

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
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TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
FAA-RD-73-24		

4. Title and Subtitle	5. Report Date
SIGNAL ANALYSIS FOR AEROSAT	August, 1972
	6. Performing Organization Code
7. Author(s)	8. Performing Organization Report No.
L. A. Frasco	DOT-TSC-FAA-72-29
9. Performing Organization Name and Address Department of Transportation Transportation Systems Center 55 Boradway Cambridge, MA 02142	10. Work Unit No. R-2152
	11. Contract or Grant No. FA211
12. Sponsoring Agency Name and Address Department of Transportation Federal Aviation Administration Office of Systems Engineering Management Washington, D.C. 20591	13. Type of Report and Period Covered Final Report Jan. 1972 - June 1972
	14. Sponsoring Agency Code

15. Supplementary Notes

16. Abstract This report addresses signal design for the AEROSAT system. Candidate data and surveillance modems are analyzed for L-Band avionics. Detailed theoretical analyses are presented of the effects of the oceanic satellite-aircraft channel on data modem performance. In addition, an L-Band avionics transceiver is proposed to meet the requirements of the Experimentation and Evaluation Phase of AEROSAT. The proposed avionics is flexible and easily adaptable to a variety of operational and access control concepts. A task plan outline is presented for an improved modem task for the following year.

17. Key Words	18. Distribution Statement
Signal Design, Multipath, AEROSAT, Avionics	DOCUMENT IS AVAILABLE TO THE PUBLIC THROUGH THE NATIONAL TECHNICAL INFORMATION SERVICE, SPRINGFIELD, VIRGINIA 22151

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
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1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
FAA-RD-72-86		

4. Title and Subtitle	5. Report Date
MICROWAVE LANDING SYSTEM SIGNAL REQUIREMENTS FOR CONVENTIONAL AIRCRAFT	July 1972
	6. Performing Organization Code
7. Author(s) Maurice H. Lanman, III	8. Performing Organization Report No. DOT-TSC-FAA-72-30
9. Performing Organization Name and Address Department of Transportation Transportation Systems Center Kendall Square Cambridge, MA 02142	10. Work Unit No. FA 209 11. Contract or Grant No.
12. Sponsoring Agency Name and Address Department of Transportation Federal Aviation Administration Systems Research & Development Service Washington, D.C. 20591	13. Type of Report and Period Covered Final Report FY 1971 14. Sponsoring Agency Code

15. Supplementary Notes

16. Abstract The results of analysis directed towards determining Microwave Landing System (MLS) signal requirements for conventional aircraft are discussed. The phases of flight considered include straight-in final approach, flareout, and rollout. A limited number of detailed problems in performance analysis are studied. Data from computer simulation, covariance propagation and system optimization, with a careful selection of variables provides a means for generalizing from the results of specific experiments to more comprehensive functional, data rate, beam noise, and control system requirements for automatic landing in turbulence.

Conclusions point toward the requirements for a re-evaluation of the MLS as sole primary landing aid; the problem arises during flareout in turbulence, when elevation information is inadequate to maintain precise sink rate control. Minimum suitable data rate and maximum allowable noise for final approach are also recommended.

17. Key Words	18. Distribution Statement
Mircowave Landing System MLS All weather landing Automatic landing	DOCUMENT IS AVAILABLE TO THE PUBLIC THROUGH THE NATIONAL TECHNICAL INFORMATION SERVICE, SPRINGFIELD, VIRGINIA 22151.

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TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
FAA-RD-73-30		

4. Title and Subtitle	5. Report Date
A SYSTEM OF SIXTEEN SYNCHRONOUS SATELLITES FOR WORLDWIDE NAVIGATION AND SURVEILLANCE	March 1973
	6. Performing Organization Code
7. Author(s)	8. Performing Organization Report No.
John J. Morrison	DOT-TSC-FAA-72-31
9. Performing Organization Name and Address	10. Work Unit No.
Department of Transportation Transportation Systems Center Kendall Square Cambridge Ma. 02142	R3112
	11. Contract or Grant No.
	FA311
12. Sponsoring Agency Name and Address	13. Type of Report and Period Covered
Department, of Transportation Federal Aviation Administration Systems Research and Development Service Washington D.C. 20591	July 1970 - June 1971 Interim Report
	14. Sponsoring Agency Code

15. Supplementary Notes

16. Abstract

This report considers the orbital mechanics aspects of a system of satellites to be used for position determination of any point on or near the surface of the earth. Only satellites having a period of twenty-four hours are examined. No perturbing forces are taken into account. Three and four satellites are required to be visible at twenty and ten degrees elevation angles respectively. A system of sixteen satellites is described which has the required properties.

17. Key Words	18. Distribution Statement
Communication Navigation Surveillance Satellite coverage Satellite constellations Global coverage, Icosahedron	DOCUMENT IS AVAILABLE TO THE PUBLIC THROUGH THE NATIONAL TECHNICAL INFORMATION SERVICE, SPRINGFIELD, VIRGINIA 22151.

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1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
FAA-RD-73-22		

4. Title and Subtitle	5. Report Date
O'Hare ASDE-2 Radome Performance in Rain; Analysis and Improvement	March 1973
	6. Performing Organization Code
7. Author(s)	8. Performing Organization Report No.
Robert M. Weigand	DOT-TSC-FAA-72-32
9. Performing Organization Name and Address	10. Work Unit No.
Department of Transportation Transportation Systems Center Kendall Square, Cambridge, MA 02142	R-2156
	11. Contract or Grant No.
	FAA-217-0
12. Sponsoring Agency Name and Address	13. Type of Report and Period Covered
Department of Transportation Federal Aviation Administration Systems Research and Development Service Washington, DC 20591	Final Report Jan 1972 - July 1972
	14. Sponsoring Agency Code
15. Supplementary Notes	

16. Abstract

The operational performance of the ASDE-2 radar at O'Hare Airport is severely limited during periods of moderate to heavy rainfall. Using the system performance specifications, an estimate has been made of the ASDE-2's tolerance to power loss and degradation of its circular polarization produced by a radome. Three aspects of the O'Hare radome have been examined as potential sources of excessive loss. These are (a) the metal space frame, (b) the dielectric constant and loss tangent of the membrane material, and (c) the membrane surface properties. It has been concluded that the membrane surface properties permit a water film buildup during rain which will cause severe losses. Hydrophobic coatings were tested in the laboratory before and after exposure to the environment. Two coating materials were found to retain their water shedding properties for several months. One of these coating materials was applied to the O'Hare ASDE-2 radome. Since coating the radome, very substantial improvement in operation has been noted during periods of rainfall.

17. Key Words	18. Distribution Statement
Radome ASDE-2 O'Hare	DOCUMENT IS AVAILABLE TO THE PUBLIC THROUGH THE NATIONAL TECHNICAL INFORMATION SERVICE, SPRINGFIELD, VIRGINIA 22151

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1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
DOT-TSC-FAA-72-33		

4. Title and Subtitle	5. Report Date
ELECTROCARDIOGRAM SCANNER-SYSTEM REQUIREMENTS	March 1973
	6. Performing Organization Code: TIF
7. Author(s): P.W. Davis, D. Ofsevit, J. Lutz	8. Performing Organization Report No.
9. Performing Organization Name and Address: DOT/Transportation Systems Center, Kendall Square, Cambridge, MA 02142	10. Work Unit No.: R3131
	11. Contract or Grant No.: FA322
12. Sponsoring Agency Name and Address: Department of Transportation, Federal Aviation Administration, Office of Aviation Medicine, Washington, DC 20591	13. Type of Report and Period Covered: Final Report, Dec. 1971 - Aug. 1972
	14. Sponsoring Agency Code: AM-130

15. Supplementary Notes

16. Abstract

An experimental and analytical study has been conducted to establish the feasibility for scanning and digitizing electrocardiogram records. The technical requirements and relative costs for two systems are discussed herein. One is designed to automate the analysis of current electrocardiograms submitted in accordance with the FAA Aeromedical certification regulations. The other is designed for retrieval and scanning of the FAA file of microfilmed electrocardiogram records.

A cost-benefit analysis of the two systems is also presented.

17. Key Words	18. Distribution Statement
Electrocardiograms, electrocardiography scanning Optical scanners	DOCUMENT IS AVAILABLE TO THE PUBLIC THROUGH THE NATIONAL TECHNICAL INFORMATION SERVICE, SPRINGFIELD, VIRGINIA 22151.

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
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1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
FAA-RD-73-39		

4. Title and Subtitle	5. Report Date
A METHOD FOR THE STUDY OF CATEGORY III AIRBORNE PROCEDURE RELIABILITY	March 1973
	6. Performing Organization Code: TIF
7. Author(s): Carl E. Feehrer	8. Performing Organization Report No.: DOT-TSC-FAA-72-35
9. Performing Organization Name and Address: Department of Transportation, Transportation Systems Center, Kendall Square, Cambridge, MA 02142	10. Work Unit No.: R 2118
	11. Contract or Grant No.: FA 207
12. Sponsoring Agency Name and Address: Department of Transportation, Federal Aviation Administration, Systems Research & Development Service, Washington, D.C. 20590	13. Type of Report and Period Covered: Final Report, FY-72
	14. Sponsoring Agency Code

15. Supplementary Notes

16. Abstract

A method for the study of Category III airborne-procedure reliability is presented. The method, based on PERT concepts, is considered to have utility at the outset of a procedure-design cycle and during the early accumulation of actual performance data. For purposes of illustration, the method is exercised on a procedural set drawn from an earlier study of all-weather-system reliability.

17. Key Words	18. Distribution Statement
Category III Systems All-Weather Landing Low-Visibility Operations	DOCUMENT IS AVAILABLE TO THE PUBLIC THROUGH THE NATIONAL TECHNICAL INFORMATION SERVICE, SPRINGFIELD, VIRGINIA 22151.

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1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
FAA-RD-72-150		

4. Title and Subtitle	5. Report Date
HUMAN FACTORS EXPERIMENTS FOR DATA LINK: INTERIM REPORT I	November 1972
	6. Performing Organization Code
7. Author(s)	8. Performing Organization Report No.
Edwin H. Hilborn	DOT-TSC-FAA-72-37
9. Performing Organization Name and Address	10. Work Unit No.
Department of Transportation Transportation Systems Center Kendall Square Cambridge, Mass. 02142	R-3130
	11. Contract or Grant No.
	FA313
	13. Type of Report and Period Covered
12. Sponsoring Agency Name and Address	Interim Report
Department of Transportation Federal Aviation Administration Systems Research & Development Service Washington, D.C. 20591	14. Sponsoring Agency Code

15. Supplementary Notes

16. Abstract

This report discusses three experiments aimed at providing information pertinent to the Data Link Operational Experiments Program. Section 1. describes the evaluation of the WIDCOM, a visual display, and a voice synthesizer for providing ATC information to pilots in a GAT-1 simulator. Section 2. is concerned with the evaluation of the intelligibility of the individual words in the vocabulary of the voice synthesizer. Section 3. describes an experiment to provide information as to possible coding formats for short message ATC commands and advisories.

The three sections of the report are independent in content, having as a common denominator their applicability to the Data Link Program.

17. Key Words	18. Distribution Statement
Air Traffic Control, Data Link, Displays, Synthetic Speech, Message Coding, Simulators	DOCUMENT IS AVAILABLE TO THE PUBLIC THROUGH THE NATIONAL TECHNICAL INFORMATION SERVICE, SPRINGFIELD, VIRGINIA 22151.

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1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
FAA-RD-73-20		

4. Title and Subtitle	5. Report Date
CLEAR AIR TURBULENCE RADIOMETRIC DETECTION PROGRAM	February 1973
	6. Performing Organization Code

7. Author(s)	8. Performing Organization Report No.
George W. Wagner, G.G. Haroules, W.E. Brown	DOT-TSC-FAA-72-38

9. Performing Organization Name and Address	10. Work Unit No.
Department of Transportation Transportation Systems Center Kendall Square Cambridge, MA 02142	R2115
	11. Contract or Grant No. FA220
	13. Type of Report and Period Covered Final Report FY-72 July 1, 1971 - June 30,1972
12. Sponsoring Agency Name and Address U.S. Department of Transportation Systems Research and Development Service Federal Aviation Administration Washington, D.C. 20591	14. Sponsoring Agency Code

15. Supplementary Notes

16. Abstract The report presents the accomplishments of the Clear Air Turbulence Detection Program for the Period July 1, 1971 to June 30, 1972. The experimental effort during this time period was devoted mainly to the flight test program, acquisition of flight data and evaluation of flight data obtained. The program established the ability of the DOT/FAA detection system to sense turbulence and verify the encounter by means of other on-board atmospheric sensors. The total of 15 flights represents 31 flight hours and 26 hours of data tape. Eight of the turbulence encounters reported during these flights are considered significant and ranged from moderate to severe. All test flights were conducted locally (within 350 miles) from NASA/Flight Research Center, Edwards, California.

Instrumentation, supporting hardware and interfaces are briefly reviewed. Improvements to the measurement technique are also presented.

Included are curves, tables and comments which support the events during particular flights where the data indicates changes in atmospheric conditions were sensed before and during turbulence encounters. The conclusions emphasize the need for additional flight tests that are coordinated with meteorological predictions of turbulence conditions in the moderate to severe classifications.

Operational experience gained with each flight allowed problems in equipment functions and data evaluation to be assessed and corrected so as to improve the "follow-on" flights that were conducted. Design improvements are recommended for existing and future sensor systems as well as use of more efficient methods of data reduction as a result of this experience.

A continuation of the flight test program is planned for the coming year by FAA.

February 1973

17. Key Words	18. Distribution Statement
Clear Air Turbulence radiometer	DOCUMENT IS AVAILABLE TO THE PUBLIC THROUGH THE NATIONAL TECHNICAL INFORMATION SERVICE, SPRINGFIELD, VIRGINIA 22151.

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
Unclassified	Unclassified	94	

Form DOT F 1700.7 (8-69)

TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
FAA-RD-73-16		

4. Title and Subtitle	5. Report Date
CONTROLLER-REPORTED PERFORMANCE DEFECTS IN THE AIR TRAFFIC CONTROL RADAR BEACON SYSTEM (1971 SURVEY)	March 1973
	6. Performing Organization Code
7. Author(s)	8. Performing Organization Report No.
Bruce Rubinger	DOT-TSC-FAA-72-40
9. Performing Organization Name and Address	10. Work Unit No.
Department of Transportation Transportation Systems Center Kendall Square Cambridge, MA. 02142	R-3124
	11. Contract or Grant No.
	FA319
12. Sponsoring Agency Name and Address	13. Type of Report and Period Covered
Department of Transportation Federal Aviation Administration Systems Research and Development Service Washington, D.C. 20591	Final Report November 1971 - December 1971
	14. Sponsoring Agency Code

15. Supplementary Notes

16. Abstract

This report analyzes the returns from a recent ATC performance survey initiated by the Beacon System Interference Problem Subgroup. The survey began on 27 November 1971 and lasted for two weeks. Participation was limited to 37 facilities with problems considered representative of the entire system; included were enroute centers, civilian towers and military air traffic installations.

Examination of the deficiency data revealed that the most common nationwide problem was the loss of beacon coverage for a short period of time. This is followed by broken target slash, ring around, loss of coverage for long time, and false targets. The returns are sorted to identify the type of aircraft involved in the reported discrepancies. For each aircraft the data is further refined on the basis of error category, and the performance summarized by an error matrix. Attention is focused on the air carriers and the beacon discrepancies associated with this group are catalogued. Air traffic statistics are derived and employed to normalize the discrepancy information. The resulting data reveals significant performance variation among the different air carriers, as well as between different aircraft. Finally, the manner in which the survey was conducted is discussed, and recommendations made for automating future performance tests.

17. Key Words	18. Distribution Statement
Air Traffic Control, Radar Beacon System, Performance Survey, Beacon Discrepancy Reports, Controller Fault Reports, Beacon System Performance	DOCUMENT IS AVAILABLE TO THE PUBLIC THROUGH THE NATIONAL TECHNICAL INFORMATION SERVICE, SPRINGFIELD, VIRGINIA 22151.

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
Unclassified	Unclassified	200	

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TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
FAA-RD-72-128 V.I		

4. Title and Subtitle	5. Report Date
Microwave Scanning Beam Approach and Landing System Phased Array Antenna Volume I	February 1973
	6. Performing Organization Code: TER
7. Author(s) R.M. Kalafus, G. J. Bishop, F.J. LaRussa, P.J. Pantano, W.R. Wade, R.S. Yatsko	8. Performing Organization Report No.: DOT-TSC-FAA-72-41
9. Performing Organization Name and Address Department of Transportation Transportation Systems Center Kendall Square Cambridge, MA. 02142	10. Work Unit No.: PPA-FA-209 11. Contract or Grant No.: R2104
12. Sponsoring Agency Name and Address Department of Transportation Federal Aviation Administration Systems Research and Development Service Washington, D.C. 20591	13. Type of Report and Period Covered Annual Report July 1971-June 1972 14. Sponsoring Agency Code

15. Supplementary Notes

16. Abstract

The use of phased arrays for the proposed landing system (MLS) is discussed. Studies relating to ground reflections, near field focusing, and phased-array errors are presented. Two experimental antennas which were fabricated and tested are described. Complete component specifications as well as test results are included.

The first annual report, having the same title, was published in September 1971 as report number FAA-RD-71-87 (TSC-FAA-71-29).

This report, the second annual report, is printed in two volumes. Volume I contains sections 1 through 7.

17. Key Words	18. Distribution Statement
Aircraft Guidance; Cylindrical Arrays; Linear Arrays; Air Traffic Control; C-Band; Components; Stripline; Microstrip; Microwave Sources.	Document is available to the public through the National Technical Information Service, Springfield, Virginia 22151.

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
Unclassified	Unclassified	246	

Form DOT F 1700.7 (8-69)

TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
FAA-RD-72-128 V. II		

4. Title and Subtitle	5. Report Date
Microwave Scanning Beam Approach and Landing System Phased Array Antenna Volume II	February 1973
	6. Performing Organization Code: TER
7. Author(s) R. M. Kalafus, G. J. Bishop, F. J. LaRussa, P. J. Pantano, W. R. Wade, R. S. Yatsko	8. Performing Organization Report No.: DOT-TSC-FAA-72-41
9. Performing Organization Name and Address: Department of Transportation, Transportation Systems Center, Kendall Square, Cambridge, MA. 02142	10. Work Unit No.: PPA FA209
	11. Contract or Grant No.: R2104
12. Sponsoring Agency Name and Address: Department of Transportation, Federal Aviation Administration, Systems Research and Development Service, Washington, D. C. 20591	13. Type of Report and Period Covered: Annual Report, July 1971 - June 1972
	14. Sponsoring Agency Code

15. Supplementary Notes

16. Abstract

The use of phased arrays for the proposed landing system (MLS) is discussed. Studies relating to ground reflections, near field focusing, and phased-array errors are presented. Two experimental antennas are described which were fabricated and tested. Complete component specifications are included, as well as test results.

The first annual report, having the same title, was published in September 1971 as report number FAA-RD-71-87 (TSC-FAA-71-29). Volume II contains Appendixes A through C.

17. Key Words	18. Distribution Statement
Aircraft Guidance; Cylindrical Arrays; Linear Arrays; Air Traffic Control; C-Band; Components; Stripline; Microstrip; Microwave Sources.	Document is available to the public through the National Technical Information Service, Springfield, Virginia 22151.

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
Unclassified	Unclassified	206	

Form DOT F 1700.7 (8-69)

TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
FAA-RD-73-6		

4. Title and Subtitle	5. Report Date
A PRELIMINARY REQUIREMENTS ANALYSIS FOR AIRPORT SURFACE TRAFFIC CONTROL SYSTEMS	January 1973
	6. Performing Organization Code

7. Author(s)	8. Performing Organization Report No.
G. Baran, R.A. Bales, J.F. Koetsch, R.E. Le Van	MTR-6273

9. Performing Organization Name and Address	10. Work Unit No.
The MITRE Corporation 1820 Dolly Madison Blvd. McLean, VA 22101	FA321/R3113
	11. Contract or Grant No. DOT-TSC-378
	13. Type of Report and Period Covered
12. Sponsoring Agency Name and Address	Interim Report April 1972-January 1973
Federal Aviation Administration Systems Research and Development Service Washington, D.C. 20591	14. Sponsoring Agency Code

15. Supplementary Notes

Printed July 1973

16. Abstract

This report summarizes the results of a preliminary ASTC (Airport Surface Traffic Control) requirements analysis. The analysis was performed under a TSC/DOT contract and its scope was restricted. Consequently, the results shown are based on limited data and additional follow-on work by TSC is planned.

The study concentrated on the analysis of the ASTC requirements at three airports (Boston-Logan, Los Angeles and Chicago O'Hare) to obtain baseline data, and extrapolated these results to an additional six airports (Seattle-Tacoma, Bradley, Cleveland, Detroit, Pittsburgh and Philadelphia) using data-of-record and the results of the baseline airport analysis.

The results of the study indicate a need for immediate improvement of the ASTC system in the 1970-1980 period at the baseline airports, with the need for improvements during peak periods at the Chicago O'Hare Airport under all visibility conditions, and at Boston and Los Angeles in poor visibility conditions. Similar results are obtained by extrapolation for the other six airports surveyed in the course of this study, with the requirements for improvement being generally less critical with respect to the time of their implementation.

The primary measures that were used to determine the requirements for improvements are; controller communication workload and communication channel overloads, the controller capability to handle simultaneously the traffic required to achieve operational rates dictated by traffic demand, and controller capability to accept and release runway traffic with small headways, relative to the existing and/or projected traffic demand.

A preliminary evaluation of the value of potential ASTC improvements indicates that surveillance improvement, coupled with procedural changes, would result in the greatest capability increase. This is followed, in terms of potential payoff, by automation of the conflict-resolution function.

A requirement for improvement of the traffic flow networks (taxiway concrete) exists and may be the major factor determining the feasibility, costs, and payoff of ASTC improvements.

17. Key Words	18. Distribution Statement
Airport Surface Traffic Control Airport Capacity Air Traffic Control	DOCUMENT IS AVAILABLE TO THE PUBLIC THROUGH THE NATIONAL TECHNICAL INFORMATION SERVICE, SPRINGFIELD, VIRGINIA 22151.

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
Unclassified	Unclassified	194	

Form DOT F 1700.7 (8-69)

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
DOT-TSC-FAA-73-3		

4. Title and Subtitle	5. Report Date
FLIGHT PLANS: STOL AVIONICS FLIGHT-TEST PROGRAM	April 1973
	6. Performing Organization Code
7. Author(s) PGS STOL Program Office	8. Performing Organization Report No. DOT-TSC-FAA-73-3
9. Performing Organization Name and Address Department of Transportation Transportation Systems Center Kendall Square Cambridge, MA 02142	10. Work Unit No. FA318/R3105 11. Contract or Grant No. DOT-TSC-379 13. Type of Report and Period Covered May 1972-Nov. 1972 Preliminary Memorandum
12. Sponsoring Agency Name and Address Department of Transportation Federal Aviation Administration Systems Research and Develop. Service Washington, D.C. 20591	14. Sponsoring Agency Code
15. Supplementary Notes	

16. Abstract

This document presents the flight-test plans for the U.S. DOT/Transportation Systems Center STOL Avionics Flight-Test Program. Tests described include:

a. Shakedown Test, Hanscom Field,
b. NAFEC Checkout Tests,
c. Area Navigation Tests,
d. Approach Flight Tests,
e. VOR Filter Tests,
f. Land/Sea Interface Tests,
g. Maneuver Flight Tests,
h. Philadelphia Noise Tests,
i. Northeast Corridor Tests,
j. Mountain Region Tests, and
k. New York City Tests.

17. Key Words	18. Distribution Statement
STOL Area Nav - VOR/DME, DME/DME LORAN C MODILS	DOCUMENT IS AVAILABLE TO THE PUBLIC THROUGH THE NATIONAL TECHNICAL INFORMATION SERVICE, SPRINGFIELD, VIRGINIA 22151.

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
Unclassified	Unclassified	288	

TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
FAA-RD-73-55		

4. Title and Subtitle	5. Report Date
HUMAN FACTORS EXPERIMENTS FOR DATA LINK Interim Report No. 2	April 1973
	6. Performing Organization Code
7. Author(s) Edwin H. Hilborn Leonard R. Devanna	8. Performing Organization Report No. DOT-TSC-FAA-73-6
9. Performing Organization Name and Address Department of Transportation Transportation Systems Center Kendall Square Cambridge, MA 02142	10. Work Unit No. R-3130
	11. Contract or Grant No. FA313
12. Sponsoring Agency Name and Address Department of Transportation Federal Aviation Administration Systems Research and Development Service Washington, DC 20591	13. Type of Report and Period Covered Interim Report August 1972 - January 1973
	14. Sponsoring Agency Code

15. Supplementary Notes

16. Abstract

Two experiments involving the coding of Air Traffic Control messages for Digital Data Link transmission are reported. Reaction times and error rates to slide presentations were recorded for both experiments as a means for assessing the relative meaningfulness of messages.

Experiment I studied the differences between long and short abbreviations with and without spaces. The need for the use of spaces was demonstrated. The experiment also indicated that with proper spacing, short and somewhat cryptic abbreviations were as useful as the longer and seemingly more meaningful abbreviations, even with only brief training of the experimental subjects.

Experiment II provided a procedural variation using the same stimulus material as that reported in Section III of Report FAA-RD-72-150, with generally comparable results. It was again determined that for short ATC messages differences in type font were not significant, that arrows were generally better than words for altitude and heading commands, that a format of three short lines was better than one extended line, and that "L" and "R" as heading commands in messages such as "HDGL230" were extremely difficult to comprehend.

17. Key Words	18. Distribution Statement
Air Traffic Control Data Link Message Coding	DOCUMENT IS AVAILABLE TO THE PUBLIC THROUGH THE NATIONAL TECHNICAL INFORMATION SERVICE, SPRINGFIELD, VIRGINIA 22151.

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
Unclassified	Unclassified	46	

Form DOT F 1700.7 (8-69)

TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
FAA-RD-73-75		

4. Title and Subtitle	5. Report Date
FEASIBILITY ANALYSIS OF AN AIR TRAFFIC CONTROL RADAR BEACON SYSTEM (ATCRBS) BASED SURFACE TRILATERATION SURVEILLANCE SYSTEM	June 1973
	6. Performing Organization Code

7. Author(s)	8. Performing Organization Report No.
John D. Vinatieri	None

9. Performing Organization Name and Address	10. Work Unit No.
THE MITRE CORPORATION Bedford, Massachusetts 01730	FA321/R3113
	11. Contract or Grant No.
	DOT-TSC-393
	13. Type of Report and Period Covered
12. Sponsoring Agency Name and Address	Final Report 1 June 1972-1 Sept. 1972
Department of Transportation Federal Aviation Administration System Research and Development Service Washington, D.C. 02591	14. Sponsoring Agency Code

15. Supplementary Notes

Performed under contract to the Department of Transportation, PPA FA-321, Transportation Systems Center, Kendall Square, Cambridge, MA 02142

16. Abstract

Analysis indicates there are feasible methods for achieving surveillance of vehicles on the airport surface by means of time-of-arrival measurements of the vehicle's ATCRBS Transponder reply at three or more receiver sites. Some methods require modification to aircraft equipment while others do not. Performance will be superior with modification to aircraft equipment. On the other hand, the number of vehicles capable of participating in the system will be smaller. The principle problems to be overcome in system design are the potential garbling of replies through fruit responses, multipath responses, and responses from more than one vehicle to a single interrogation. The analysis indicates that techniques exist to overcome these effects with sufficient promise to warrant an austere implementation of a Data Acquisition Subsystem.

Contained herein is a definition of an ATCRBS Based Surface Surveillance System, analyses of various problems and techniques to achieve a satisfactory Data Acquisition Subsystem, and criteria for conducting a test program for further verification of feasibility and design.

17. Key Words	18. Distribution Statement
ATCRBS ASDE Ground Surveillance	DOCUMENT IS AVAILABLE TO THE PUBLIC THROUGH THE NATIONAL TECHNICAL INFORMATION SERVICE, SPRINGFIELD, VIRGINIA 22151.

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
Unclassified	Unclassified	238	

Form DOT F 1700.7 (8-69)

FEDERAL HIGHWAY ADMINISTRATION

DOT-TSC-FHWA-73-1

Freeway Traffic Flowing a Lane Blockage,
by D. Kahn and R. Mintz
Final Report, January 1973

Unlimited-Distribution Report

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
DOT-TSC-FHWA-73-1		

4. Title and Subtitle	5. Report Date
FREEWAY TRAFFIC FLOW FOLLOWING A LANE BLOCKAGE	January 1973
	6. Performing Organization Code
7. Author(s)	8. Performing Organization Report No.
David Kahn and Ronald Mintz	DOT-TSC-FHWA-73-1
9. Performing Organization Name and Address	10. Work Unit No.
Department of Transportation Transportation Systems Center Kendall Sqaure Cambridge, MA 02142	R3204
	11. Contract or Grant No.
	HW 308
12. Sponsoring Agency Name and Address	13. Type of Report and Period Covered
Department of Transportation Federal Highway Administration Fairbanks Highway Research Station McLean, VA 22101	Final Report July 1973
	14. Sponsoring Agency Code

15. Supplementary Notes

16. Abstract

The theory of traffic flow following a lane blockage on a multi-lane freeway has been developed. Numerical results have been obtained and are presented both for the steady state case where the traffic density remains constant and the non-steady state case where the traffic density changes with time.

17. Key Words	18. Distribution Statement
Traffic flow, Discontinuity, Shock wave, Lane blockage, Propagation	DOCUMENT IS AVAILABLE TO THE PUBLIC THROUGH THE NATIONAL TECHNICAL INFORMATION SERVICE, SPRINGFIELD, VIRGINIA 22151.

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
UNCLASSIFIED	UNCLASSIFIED	60	

FEDERAL RAILROAD ADMINISTRATION

DOT-TSC-FRA-72-1/FRA-RT-73-15 PB 221-616
Simulation of Power Collection Dynamics for Simply Supported Power Rail
by C. H. Spenny,
Final Report, February 1973

DOT-TSC-FRA-72-10/FRA-RT-73-21 PB 219-820
Analytical Studies of the Lift and Roll Stability of a Ram Air Cushion Vehicle,
by T. M. Barrows
Interim Report, March 1973

DOT-TSC-FRA-72-12/FRA-RT-73-24
The Effect of Solid State Power Converter Harmonics on Electric Power Supply Systems,
by A. Kusko,
Final Report, March 1973 (Contractor Report)

DOT-TSC-FRA-72-13/FRA-ORD&D-74-9
Power Conditioning for High-Speed Tracked Vehicles,
by F. Reposa, T. Knutrud, and J. Wawzonek,
Final Report, February 1973

Unlimited-Distribution Reports

1. Report No.	2 Government Accession No	3 Recipient's Catalog No
FRA-RT-73-15		

4 Title and Subtitle	5 Report Date
SIMULATION OF POWER COLLECTION DYNAMICS FOR SIMPLY SUPPORTED POWER RAIL	NOVEMBER 1972
	6 Performing Organization Code

7 Author(s)	8 Performing Organization Report No
C.H. Spenny	DOT-TSC-FRA-72-1

9 Performing Organization Name and Address	10 Work Unit No
Transportation Systems Center Kendall Square Cambridge, MA 02142	R2301
	11 Contract or Grant No RR205
	13 Type of Report and Period Covered JULY 1971-JUNE 1972 Final Report
12 Sponsoring Agency Name and Address Department of Transportation Federal Railroad Administration Office of Res., Devel. & Demon. Washington, D.C. 20590	14 Sponsoring Agency Code

15 Supplementary Notes

16 Abstract

The mathematical model of a sprung mass moving along a simply supported beam is used to analyze the dynamics of a power-collection system. A computer simulation of one-dimensional motion is used to demonstrate the phenomenon of collector-power rail interaction. Parametric resonance in an undamped collector is shown to exist at several speeds below 300 miles per hour. However, it is demonstrated that amplitude can be controlled at all of these resonant speeds with the proper use of damping.

February 1973

17. Key Words	18. Distribution Statement
Power Collection, High Speed Tracked Vehicles	DOCUMENT IS AVAILABLE TO THE PUBLIC THROUGH THE NATIONAL TECHNICAL INFORMATION SERVICE, SPRINGFIELD, VIRGINIA 22151.

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
Unclassified	Unclassified	48	

TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
FRA-RT-73-21		

4. Title and Subtitle	5. Report Date
ANALYTICAL STUDIES OF THE LIFT AND ROLL STABILITY OF A RAM AIR CUSHION VEHICLE	December 1972
	6. Performing Organization Code
7. Author(s)	8. Performing Organization Report No.
Timothy M. Barrows	DOT-TSC-FRA-72-10
9. Performing Organization Name and Address	10. Work Unit No.
Department of Transportation Transportation Systems Center Kendall Square Cambridge, MA 02142	R3316
	11. Contract or Grant No.
	RR307
	13. Type of Report and Period Covered
12. Sponsoring Agency Name and Address	Interim Report July 1971 to June 1972
Department of Transportation Federal Railroad Administration Office of Rsch., Dev. and Demonstrations Washington, D.C. 20590	14. Sponsoring Agency Code

15. Supplementary Notes

16. Abstract

A ram air cushion vehicle (a type of ram wing) is described schematically and compared with a conventional air cushion vehicle design. The nonlinear equations for the flow in the cushion region are derived. A review is made of the most recent literature on the subject of wings operating in a rectangular channel, and an approximate solution is developed which shows the relative effects of momentum and viscosity on the pressure distribution. Several analytic solutions are presented which show the effect of a small roll angle on the flow pattern; equations for the rolling moment coefficient are also obtained. It is recommended that future efforts be aimed at developing proper numerical techniques which can solve the nonlinear flow relations and that recent experimental efforts to obtain the lateral stability coefficients be continued and expanded.

March 1973

17. Key Words	18. Distribution Statement
Ram Wing Ram Air Cushion Tracked Air Cushion Vehicle	DOCUMENT IS AVAILABLE TO THE PUBLIC THROUGH THE NATIONAL TECHNICAL INFORMATION SERVICE, SPRINGFIELD, VIRGINIA 22151.

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
Unclassified	Unclassified	68	

Form DOT F 1700.7 (8-69)

TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
FRA-RT-73-24		

4. Title and Subtitle	5. Report Date
The Effect of Solid State Power Converter Harmonics on Electric Power Supply Systems.	March 1973
	6. Performing Organization Code
7. Author(s)	8. Performing Organization Report No.
Alexander Kusko	DOT-TSC-FRA-72-12
9. Performing Organization Name and Address	10. Work Unit No.
Alexander Kusko, Inc. 161 Highland Avenue Needham Heights, Mass. 02194	R3306
	11. Contract or Grant No. DOT-TSC-203 RR-305
	13. Type of Report and Period Covered
12. Sponsoring Agency Name and Address	FINAL REPORT
Department of Transportation Federal Railroad Administration Office of Research Development and Demons. Washington D.C. 20591	14. Sponsoring Agency Code

15. Supplementary Notes

Prepared under Contract No. DOT-TSC-203 and Technical Directive DOT-TSC-203-2 for Frank L. Raposa, Code TMP Technical Monitor, U.S. DOT, TSC, Cambridge, Ma. 02142

16. Abstract

The United States utility industry has not set suitable standards other than TIF (Telephone Interference Factor), for controlling the design of solid-state wayside and on-board power-conversion equipment, to limit the harmonic currents and voltages in both the transit and electric-power-supply systems. To reduce interference with telecommunications and control equipment, and to insure reliable operation of power equipment, the manufacturers can attenuate the power harmonics by selecting the converter pulse number and by the use of filters. Techniques for calculating the harmonic voltages have been developed and can be applied to transit systems. We propose a standard of 10 percent of fundamental amplitude for each harmonic voltage at the connection point to the utility and 3 percent for each harmonic voltage within the transit system such as the power rails.

17. Key Words	18. Distribution Statement
Power Harmonic Effects Solid-State Converter Harmonics	Document is available to the public through the national technical information service, Springfield, Virginia 22151.

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
UNCLASSIFIED	UNCLASSIFIED	38	

Form DOT F 1700.7 (8-69)

1. Report No. DOT-TSC-FR-71-1A	2. Government Accession No.	3. Recipient's Catalog No.
4. Title and Subtitle POWER CONDITIONING FOR HIGH SPEED TRACKED VEHICLES		5. Report Date January, 1973 6. Performing Organization Code
7. Author(s) Frank L. Raposa, Thorlief Knutrud, John J. Wawzonek		8. Performing Organization Report No. DOT-TSC-FRA-72-13
9. Performing Organization Name and Address Department of Transportation Transportation Systems Center Kendall Square Cambridge, Mass. 02142		10. Work Unit No. R-2301 11. Contract or Grant No. RR-205 13. Type of Report and Period Covered
12. Sponsoring Agency Name and Address Federal Railroad Administration Office of Research Development & Demo. Washington, D.C. 20590		Final Report 14. Sponsoring Agency Code
15. Supplementary Notes		

16. Abstract The linear induction motor is to provide the propulsion of high-speed tracked vehicles; speed and brake control of the propulsion motor is essential for vehicle operation. The purpose of power conditioning is to provide the power matching interface between the available power and the desired power for driving the propulsion motor.

This report presents a technical survey of power conditioners that are applicable for driving the linear induction motor in the variable frequency power mode. Power conditioning systems have been selected for technical evaluation and the results are also presented in this report. These systems include the motor-alternator, naturally commutated inverter, forced commutated inverter, and the synchronous inverter-condenser power conditioners.

February 1973

17. Key Words	18. Distribution Statement		
Variable Frequency Power, Power Conditioning	DOCUMENT IS AVAILABLE TO THE PUBLIC THROUGH THE NATIONAL TECHNICAL INFORMATION SERVICE, SPRINGFIELD, VIRGINIA 22151.		
19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
Unclassified	Unclassified	252	

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

DOT-TSC-NASA-72-2
L-Band Orthogonal-Mode Crossed-Slot Antenna and VHF Crossed-Loop Antenna,
by T. Olsson and B. Stapleton,
Final Report, August 1972 (Contractor Report)

Unlimited-Distribution Report

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
DOT-TSC-NASA-72-2		

4. Title and Subtitle	5. Report Date
L-BAND ORTHOGONAL-MODE CROSSED-SLOT ANTENNA AND VHF CROSSED-LOOP ANTENNA	August 1972
	6. Performing Organization Code
7. Author(s)	8. Performing Organization Report No.
Tryggvi Olsson and Brian P. Stapleton	D6-60163
9. Performing Organization Name and Address	10. Work Unit No. NA-05/OS-219
The Boeing Company P.O. Box 3707 Seattle, Washingon 98124	R-1021 and R-2525
	11. Contract or Grant No. DOT-TSC-130
	13. Type of Report and Period Covered Contractor Final Report
12. Sponsoring Agency Name and Address	14. Sponsoring Agency Code
National Aeronautics and Space Admin. Communications Programs Washington, D.C. 20546	

15. Supplementary Notes Key words Cont. Antenna, Aeronautical

16. Abstract

A low-gain, circularly polarized, L-band antenna; a low-gain, lineraly polarized, L-band antenna; and a low-gain, circularly polarized, upper hemisphere, VHF satellite communications antenna intended for airborne applications are described in this report. The text includes impedance and antenna radiation pattern data, along with physical description of the construction of the antennas.

17. Key Words	18. Distribution Statement
Balanced feed, Orthogonal mode, Circular polarization, Characteristic impedance, Aircraft Antennas Hemispherical Antennas	DOCUMENT IS AVAILABLE TO THE PUBLIC THROUGH THE NATIONAL TECHNICAL INFORMATION SERVICE, SPRINGFIELD, VIRGINIA 22151.

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
Unclassified	Unclassified		

NATIONAL HIGHWAY TRAFFIC
SAFETY ADMINISTRATION

DOT-TSC-NHTSA-72-9
Instrumentation Development for Drug Detection on the Breath,
by A. E. Barrington, and J. R. Hobbs,
Final Report, September 1972

DOT-TSC-NHTSA-72-10
Exhaust-System Leak Test: Quantitative Procedure,
by E. C. Klaubert,
Final Report, June 1973

DOT-TSC-NHTSA-73-3
Laboratory Evaluation of Alcohol Safety Interlock Systems
Volume I-Summary Report,
by E. Sussman, and C. Abernethy III,
Final Report, April 1973

DOT-TSC-NHTSA-73-3
Laboratory Evaluation of Alcohol Safety Interlock Systems,
Volume II-Instrument Screening Experiments,
by R. McFarland, J. Dougherty, E. Arees, J. Gird,
Final Report, April 1973 (Contractor Report)

DOT-TSC-NHTSA-73-3
Laboratory Evaluation of Alcohol Safety Interlock Systems,
Volume III-Instrument Performance At High Bal,
by J. Oates, Jr., and R. McCay,
Final Report, April 1973 (Contractor Report)

64149/DOT-TSC-409
Automobile Crash-Sensor Signal Processor
by Burroughs Corporation Defense, Space and Special Systems
Group,
Final Report, February 1973 (Contractor Report)

Nondestructive Tire Inspection Studies at the Transportation
Systems Center,
by I. Litant,
Paper to Society of Automotive Engineers (SAE),
May 1973 meeting in Detroit, Michigan

Unlimited-Distribution Report

TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.

4. Title and Subtitle	5. Report Date
INSTRUMENTATION DEVELOPMENT FOR DRUG DETECTION ON THE BREATH	September 1972
	6. Performing Organization Code
7. Author(s)	8. Performing Organization Report No.
J.R. Hobbs and A.E. Barrington	DOT-TSC-NHTSA-72-9
9. Performing Organization Name and Address Department of Transportation Transportation Systems Center Kendall Square Cambridge, Ma. 02142	10. Work Unit No. R-3405 11. Contract or Grant No. HS-302
12. Sponsoring Agency Name and Address Department of Transportation National Highway Traffic Safety Administration Research Institute Washington, D.C. 20591	13. Type of Report and Period Covered Final Report July 1971-April 1972 14. Sponsoring Agency Code

15. Supplementary Notes

16. Abstract

Based on a survey of candidate analytical methods, mass spectrometry was identified as a promising technique for drug detection on the breath. To demonstrate its capabilities, an existing laboratory mass spectrometer was modified by the addition of a membrane separator and a field-ionization source.

Fourteen drugs were selected for investigation and it was possible to identify the signatures (mass spectra) of ten of these drugs with the modified instrument. Some drugs have been detected by direct sniffing, others first had to be dissolved in a suitable solvent and evaporated. The mass spectra presented in the report indicate the basic simplicity of field ionization as compared with ionization by the conventional method of electron impact. The report concludes with a description of the ease and rapidity of the new technique for clinical analysis.

January 1973

17. Key Words	18. Distribution Statement
Mass Spectrometry Breath Analysis Drug Signatures	DOCUMENT IS AVAILABLE TO THE PUBLIC THROUGH THE NATIONAL TECHNICAL INFORMATION SERVICE, SPRINGFIELD, VIRGINIA 22151.

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
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TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.

4. Title and Subtitle	5. Report Date
EXHAUST-SYSTEM LEAK TEST: QUANTITATIVE PROCEDURE	June 1973
	6. Performing Organization Code
7. Author(s)	8. Performing Organization Report No.
Earl C. Klaubert	DOT-TSC-NHTSA-72-10
9. Performing Organization Name and Address	10. Work Unit No.
Department of Transportation Transportation Systems Center Kendall Square Cambridge, MA 02142	R3402—HS201
	11. Contract or Grant No.
	13. Type of Report and Period Covered
12. Sponsoring Agency Name and Address	Final Report July 1970 to June 1972
National Highway Traffic Safety Administration Department of Transportation Washington, D.C. 20591	14. Sponsoring Agency Code

15. Supplementary Notes

16. Abstract

A quantitative, periodic motor vehicle safety-inspection test for determining the leakage rate of engine exhaust from an automotive exhaust system was investigated. Two technical approaches were evaluated, and the better one was selected for development of necessary special equipment and test procedures. The results of the measurement are expressed as the diameter of a single round hole, equivalent in leakage rate to the sum of all leaks in the exhaust system being tested. This method is capable of measuring leaks equivalent in size down to about a 1/16-inch hole; discrimination between leaks of 1/8-to 1/2-inch diameter is reliable and easily achieved. Total time to conduct a test and evaluate results is estimated to be from 2 to 5 minutes. In addition, the test imposes a reproducible pressure stress on each system tested; this provides reasonable assurance that the system will remain structurally intact until the next inspection period without developing catastrophic leakage. A field test kit has been developed which can accommodate engine displacements to 460 cubic inches. Flow calibration data are given. A detailed test procedure complete with leak-size determination graphs and a calculation nomograph is presented in an appendix.

17. Key Words	18. Distribution Statement
Leak test, exhaust system, automotive; Inspection safety; Orifice flowmeter	DOCUMENT IS AVAILABLE TO THE PUBLIC THROUGH THE NATIONAL TECHNICAL INFORMATION SERVICE, SPRINGFIELD, VIRGINIA 22151.

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
Unclassified	Unclassified	110	

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TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.

4. Title and Subtitle	5. Report Date
LABORATORY EVALUATION OF ALCOHOL SAFETY INTERLOCK SYSTEMS, VOLUME I - SUMMARY REPORT	April, 1973
	6. Performing Organization Code
7. Author(s)	8. Performing Organization Report No.
E. Donald Sussman, Charles N. Abernethy, III	DOT-TSC-NHTSA-73-3
9. Performing Organization Name and Address Department of Transportation Transportation Systems Center Kendall Square Cambridge, MA 02142	10. Work Unit No. HS306
	11. Contract or Grant No.
	13. Type of Report and Period Covered Final Report 8/71 - 10/72
12. Sponsoring Agency Name and Address Department of Transportation National Highway Traffic Safety Administration Research Institute Washington, DC 20591	14. Sponsoring Agency Code

15. Supplementary Notes

16. Abstract This report contains the results of an experimental and analytical evaluation of instruments and techniques designed to prevent an intoxicated driver from operating his automobile. The prototype "Alcohol Safety Interlock Systems" tested were developed both by private industry and by the Transportation Systems Center and all were drawn from a class of instruments which detect intoxication by measuring changes in the subjects ability to perform a psychomotor task. The final report consists of the following documents:

Volume I, Summary Report - Summarizes all of the ASIS evaluation work performed through July 1972 and the results of the evaluation. Volume I is supported by an extensive appendix.

Volume II, Instrument Screening Experiments - Contains details of the experiments conducted by the Guggenheim Center, Harvard School of Public Health, including experimental procedures, results and some preliminary data analyses.

Volume III, Instrument Performance at High BAL - Contains the results of the experimental work performed by Dunlap and Associates, Inc., covering the performance of subjects with relatively high blood alcohol levels on selected instruments.

17. Key Words	18. Distribution Statement
Alcohol, intoxication interlock, intoxicated performance, habitual drinker	DOCUMENT IS AVAILABLE TO THE PUBLIC THROUGH THE NATIONAL TECHNICAL INFORMATION SERVICE, SPRINGFIELD, VIRGINIA 22151.

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
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1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.

4. Title and Subtitle	5. Report Date
LABORATORY EVALUATION OF ALCOHOL SAFETY INTERLOCK SYSTEMS, VOLUME II - INSTRUMENT SCREENING EXPERIMENTS	April 1973
	6. Performing Organization Code

7. Author(s)	8. Performing Organization Report No.
Ross A. McFarland, Ph.D., John D. Dougherty, M.D. Edward A. Arees, Ph.D., Joyce J. Gird, B.A.	DOT-TSC-213-1

9. Performing Organization Name and Address	10. Work Unit No.
Guggenheim Center for Aerospace Health and Safety Harvard School of Public Health 665 Huntington Avenue Boston, MA 02115	HS306/R3407
	11. Contract or Grant No. DOT-TSC-213
	13. Type of Report and Period Covered Final Report 8/71 - 10/72
12. Sponsoring Agency Name and Address Department of Transportation National Highway Traffic Safety Administration Research Institute Washington, DC 20591	14. Sponsoring Agency Code

15. Supplementary Notes

16. Abstract

This report contains the results of an experimental and analytical evaluation of instruments and techniques designed to prevent an intoxicated driver from operating his automobile. The prototype "Alcohol Safety Interlock Systems" tested were developed both by private industry and by the Transportation Systems Center and were all drawn from a class of instruments which detect intoxication by measuring changes in the subjects ability to perform a psychomotor task. The final report consists of the following documents:

Volume I, Summary Report - Contains an overview and summary of all the ASIS evaluation work performed through July 1972 and the results of the evaluation. Volume I is divided between the overview and an extensive appendix.

Volume II, Instrument Screening Experiments - Contains details of the experiments conducted by the Guggenheim Center, Harvard School of Public Health, including experimental procedures, results and some preliminary data analyses.

Volume III, Instrument Performance at High BAL - Contains the results of the experimental work performed by Dunlap and Associates, Inc., covering the performance of subjects with relatively high blood alcohol levels on selected instruments.

17. Key Words	18. Distribution Statement
alcohol, intoxication, interlock, intoxicated performance habitual drinker	DOCUMENT IS AVAILABLE TO THE PUBLIC THROUGH THE NATIONAL TECHNICAL INFORMATION SERVICE, SPRINGFIELD, VIRGINIA 22151.

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
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TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.

4. Title and Subtitle	5. Report Date
LABORATORY EVALUATION OF ALCOHOL SAFETY INTERLOCK SYSTEMS, VOLUME III - INSTRUMENT PERFORMANCE AT HIGH BAL.	April 1973
	6. Performing Organization Code
7. Author(s) John F. Oates, Jr., Robert T. McCay	8. Performing Organization Report No. DOT-TSC-251-4
9. Performing Organization Name and Address Dunlap & Associates, Inc. One Parkland Drive Darien, Conn., 06820	10. Work Unit No. HS306/R3407
	11. Contract or Grant No. DOT-TSC-251
12. Sponsoring Agency Name and Address Department of Transportation National Highway Traffic Safety Administration Research Institute Washington, DC	13. Type of Report and Period Covered Final Report 8/71 - 10/72
	14. Sponsoring Agency Code

15. Supplementary Notes

16. Abstract

This report contains the results of an experimental and analytical evaluation of instruments and techniques designed to prevent an intoxicated driver from operating his automobile. The prototype "Alcohol Safety Interlock Systems" tested were developed both by private industry and by the Transportation Systems Center and were all drawn from a class of instruments which detect intoxication by measuring changes in the subjects ability to perform a psychomotor task. The final report consists of the following documents:

Volume I, Summary Report - Contains an overview and summary of all of the ASIS evaluation work performed through July 1972 and the results of the evaluation. Volume I is divided between the overview and an extensive appendix.

Volume II, Instrument Screening Experiments - Contains details of the experiments conducted by the Guggenheim Center, Harvard School of Public Health, including experimental procedures, results and some preliminary data analyses.

Volume III, - Instrument Performance at High BAL - Contains the results of the experimental work performed by Dunlap and Associates, Inc., covering the performance of subjects with relatively high blood alcohol levels on selected instruments.

17. Key Words	18. Distribution Statement
alcohol, intoxication, interlock, intoxicated performance, habitual drinker	DOCUMENT IS AVAILABLE TO THE PUBLIC THROUGH THE NATIONAL TECHNICAL INFORMATION SERVICE, SPRINGFIELD, VIRGINIA 22151.

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
Unclassified	Unclassified	124	

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TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.

4. Title and Subtitle	5. Report Date
AUTOMOBILE CRASH-SENSOR SIGNAL PROCESSOR	March 1973
	6. Performing Organization Code
7. Author(s)	8. Performing Organization Report No.
	64149
9. Performing Organization Name and Address Burroughs Corporation Defense, Space and Special Systems Group Paoli, Pennsylvania 19301	10. Work Unit No. HS304/R3403
	11. Contract or Grant No. DOT-TSC-409
	13. Type of Report and Period Covered Final Report Apr 1 1972 - Feb. 1973
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration Research Institute Washington, D.C. 20590	14. Sponsoring Agency Code
15. Supplementary Notes	

16. Abstract

The Crash Sensor Signal Processor described interfaces between an automobile-installed doppler radar and an air bag activating solenoid or equivalent electromechanical device. The processor utilizes both digital and analog techniques to produce an output pulse when specified input signal amplitude and frequency conditions are met. The device is intended to be implemented with monolithic MOS large scale integrated circuitry and Bipolar driver. The design and reliability studies indicate that very low cost and very high reliability can be achieved concurrently by monolighic techniques without compromising Processor performance.

17. Key Words	18. Distribution Statement
Automobile-Crash; Crash-Sensor; Signal-Processor; Vehicle Passive Restraint System; Passenger Restraint System	DOCUMENT IS AVAILABLE TO THE PUBLIC THROUGH THE NATIONAL TECHNICAL INFORMATION SERVICE, SPRINGFIELD, VIRGINIA 22151.

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
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NONDESTRUCTIVE TIRE INSPECTION STUDIES AT THE TRANSPORTATION SYSTEMS CENTER

I. LITANT

U.S. Department of Transportation
Transportation Systems Center
Kendall Square
Cambridge, Mass. 02142

To be presented at the 1973 SAE
National Automobile Engineering
Meeting, May 14-18, 1973.

OFFICE OF THE SECRETARY

DOT-OST-TSC-72-16 PB-213 323-9
A Microwave Technique for Detecting and Locating Concealed Weapons,
by R. M. Weigand,
Final Report, December 1971

DOT-TSC-OST-72-19 PB-214 459
Ambient Noise Level Measurements in Proposed Florida Airport Area,
by R. Quinn,
Final Report, December 1972

DOT-TSC-OST-72-24 PB-218 461
FY 72 Computer Utilization at the Transportation System Center,
by D. Hyatt,
Final Report, September 1972

DOT-TSC-OST-72-25
The Use of Models in Urban Transportation Planning,
by W. G. Barker,
Final Report, April 1973

DOT-TSC-OST-72-30 PB-218 460
Accumulative Probability Model for Automated Network Traffic Analyses,
by C. Toye,
Final Report, October 1972

DOT-TSC-OST-72-31
MBTA Rapid Transit System (Red Line) Wayside and In-Car Noise and Vibration Level Measurements,
by E. Rickley, and R. Quinn
Final Report, February 1973

DOT-TSC-OST-72-33 PB-220 564
An Experimental Plan for Conducting Ionospheric Scintillation Measurements Using the ATS Geostationary Satellites at 136 and 1550 MHz
by W. E. Brown III, G. G. Haroules, and W. I. Thompson III
Interim Report, April 1973

DOT-TSC-OST-72-35
Summary Data for Selected New Urban Transportation Systems,
by R. Casey,
Final Report, March 1973

Unlimited-Distribution Report

OFFICE OF THE SECRETARY

DOT-TSC-OST-73-1 PB-216 622
Electrochemical Power Sourses for Electric Highway Vehicles,
by J. H. B. George,
Final Report, June 1972 (Contractor Report)

DOT-TSC-OST-73-3
Airport and Air Service Access,
by R. de Neufville, N. Wilson, H. Moore, III, W. Gelerman, U. Landau, J. Yaney
Final Report, February 1973 (Contractor Report)

DOT-TSC-OST-73-9 PB-220 553
A Summary of Optimization Techniques that can be Applied to Suspension System Design,
by J. Hendrick,
Final Report, March 1973

DOT-TSC-OST-73-11 PB-214 112
Investigation of Jet Noise Using Optical Holography,
by F. Salant,
Final Report, April 1973 (Contractor Report)

DOT-TSC-OST-73-14 PB-220 612
Research and Development Opportunities for Improved Transportation Energy Usage, by the Transportation Energy Panel
Technical Report, April 1973

DOT-TSC-OST-73-16 I
Analysis of Dual Mode Systems In An Urban Area, Volume I: Summary,
by P. Benjamin, J. Bailer, R. Favout, D. Golddel, C. Heaton, R. Kangas, G. Paules, E. Roberts, L. Vance,
Final Report, April 1973

DOT-TSC-OST-73-19 PB-221 140
Prediction of V/STOL Noise for Application to Community Noise Exposure,
by C. L. Munch
Final Report, May 1973 (Contractor Report)

Unlimited-Distribution Report

1. Report No. DOT-TSC-OST-72-16	2. Government Accession No.	3. Recipient's Catalog No.
4. Title and Subtitle A MICROWAVE TECHNIQUE FOR DETECTING AND LOCATING CONCEALED WEAPONS		5. Report Date December 1971 6. Performing Organization Code
7. Author(s) R.M. Weigand		8. Performing Organization Report No.
9. Performing Organization Name and Address Department of Transportation Transportation Systems Center 55 Broadway, Cambridge, MA 02142		10. Work Unit No. R-2521 11. Contract or Grant No. OS213
12. Sponsoring Agency Name and Address Department of Transportation Office of the Secretary Office of Systems Engineering Washington, D.C. 20590		13. Type of Report and Period Covered Final Report March 1971-Sept.1971 14. Sponsoring Agency Code
15. Supplementary Notes		

16. Abstract The subject of this report is the evaluation of a microwave technique for detecting and locating weapons concealed under clothing. The principal features of this technique are: (1) Persons subjected to search are not exposed to "objectional" microwave radiation; (2) A simple threshold detector can be used as the decision element obviating complex signal processing; (3) System operation does not require extensive operator training; (4) The resolution of the system (2 inches x 2 inches) permits location of a suspected weapon. This latter feature eliminates the need for a complete search of a passenger. Results of a loboratory measurement program are presented in support of the technique. An engineering analysis of the system implementation identifies an optimum operating frequency and an estimate of system cost is presented. Finally, several areas requiring additional experimental evaluation preceeding a system implementation are identified.

17. Key Words	18. Distribution Statement
Microwave Detection Concealed Weapons	Document is available to the public through the National Technical Information Service, Springfield, Virginia 22151.

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
Unclassified	Unclassified	44	

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
DOT-TSC-OST-72-19		

4. Title and Subtitle	5. Report Date
AMBIENT NOISE LEVEL MEASUREMENTS IN PROPOSED FLORIDA AIRPORT AREA	December 1972
	6. Performing Organization Code
7. Author(s)	8. Performing Organization Report No.
Robert W. Quinn	
9. Performing Organization Name and Address	10. Work Unit No.
U.S. Department of Transportation Transportation Systems Center Kendall Square Cambridge, MA 02142	R3530
	11. Contract or Grant No.
	OS-307
12. Sponsoring Agency Name and Address	13. Type of Report and Period Covered
Department of Transportation Office of the Secretary Office of Noise Abatement Washington, D.C. 20590	Final Report
	14. Sponsoring Agency Code

15. Supplementary Notes

16. Abstract This report documents the measurement results made at ten locations near the three remaining sites being studied for the "South Florida Regional Airport."

Tabulated data display a summary of the measured noise levels at each location expressed as noise levels exceeded 1, 10, 50, 90 and 99 percent of the time in A-weighted decibels. The standard deviation, minimum and maximum A-weighted levels are also tabulated.

17. Key Words	18. Distribution Statement
A-weighted Sound Level Walsh-Healey Exposure Median Noise Level L-10 Noise Level Noise-Pollution Level	DOCUMENT IS AVAILABLE TO THE PUBLIC THROUGH THE NATIONAL TECHNICAL INFORMATION SERVICE, SPRINGFIELD, VIRGINIA 22151.

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
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TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
DOT-TSC-OST-72-24		

4. Title and Subtitle	5. Report Date
FY 72 COMPUTER UTILIZATION AT THE TRANSPORTATION SYSTEMS CENTER	August 1972
	6. Performing Organization Code

7. Author(s)	8. Performing Organization Report No.
David B. Hiatt	

9. Performing Organization Name and Address	10. Work Unit No.
Department of Transportation Transportation Systems Center Kendall Square Cambridge, MA. 02142	R2557
	11. Contract or Grant No. OS223
	13. Type of Report and Period Covered Final Report
12. Sponsoring Agency Name and Address Department of Transportation Office of the Secretary Office of Research and Development Policy Washington, D.C. 20590	14. Sponsoring Agency Code

15. Supplementary Notes

16. Abstract

The Transportation Systems Center currently employs a medley of on-site and off-site computer systems to obtain the computational support it requires. Examination of the monthly User Accountability Reports for FY72 indicated that during the fiscal year TSC personnel made direct expenditures for the use of eighteen different digital computer systems - eight on-site systems and ten systems owned and maintained outside TSC. The magnitude of this usage was equivalent to a single CDC 6600 computer system. The total computation hours utilized were equivalent to 1860 CDC 6600 CPU hours - a single shift - and the estimated dollar value was $1.38 million - approximately the annual rental cost of a CDC 6600.

Examination of the pattern of this usage indicated that (a) TSC was still oriented toward hardware testing and component design - generally termed hard technology - in FY 72, and (b) TSC's scientific computer users rely on off-site systems for the bulk (69%) of their computer support.

17. Key Words	18. Distribution Statement
Computers, Digital Computers, Utilization Computers, Hours Computers, Expenses	DOCUMENT IS AVAILABLE TO THE PUBLIC THROUGH THE NATIONAL TECHNICAL INFORMATION SERVICE, SPRINGFIELD, VIRGINIA 22151.

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
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1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
DOT-TSC-OST-72-25		

4. Title and Subtitle	5. Report Date
THE USE OF MODELS IN URBAN TRANSPORTATION PLANNING	April 1973
	6. Performing Organization Code
7. Author(s)	8. Performing Organization Report No.
William G. Barker	DOT-TSC-OST-72-25
9. Performing Organization Name and Address	10. Work Unit No.
Department of Transportation Transportation Systems Center Kendall Square, Cambridge MA 02142	R3599/0E-202
	11. Contract or Grant No.
	13. Type of Report and Period Covered
12. Sponsoring Agency Name and Address	Final Report: July 1971-June 1972
Department of Transportation Office of the Secretary Office of Transportation Planning Assistance Washington DC 20590	14. Sponsoring Agency Code

15. Supplementary Notes

16. Abstract

The report describes the most commonly used models in urban transportation planning. A background on urban transportation planning is given including changes in planning objectives and the effects of Federal legislation. General concepts and problems in the use of the models are also presented. An assessment of the situation is made and recommendations for improvement are suggested.

17. Key Words	18. Distribution Statement
Urban Transportation Planning Transportation Models Computer Models	DOCUMENT IS AVAILABLE TO THE PUBLIC THROUGH THE NATIONAL TECHNICAL INFORMATION SERVICE, SPRINGFIELD, VIRGINIA 22151.

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
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TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
DOT-TSC-OST-72-30		

4. Title and Subtitle	5. Report Date
ACCUMULATIVE PROBABILITY MODEL FOR AUTOMATED NETWORK TRAFFIC ANALYSES	October 1972
	6. Performing Organization Code
7. Author(s)	8. Performing Organization Report No.
Charles R. Toye	
9. Performing Organization Name and Address	10. Work Unit No.
Department of Transportation Transportation Systems Center Kendall Square Cambridge, MA 02142	R-3517
	11. Contract or Grant No.
	OS-318
12. Sponsoring Agency Name and Address	13. Type of Report and Period Covered
Department of Transportation Office of the Secretary Office of Systems Engineering Washington, D.C. 20590	Final Report 1 July 1972 to 31 December 1972
	14. Sponsoring Agency Code

15. Supplementary Notes

16. Abstract

This report presents an illustration of the accumulative probability model which is applicable to ground transportation systems where high-speed and close headways are a performance requirement. The paper describes the model, illustrates it with a hypothetical problem, and then applies it to a network route that was actually configured in a Dual mode system study.

The paper also describes and gives a listing of a computer program called Dual which is used to illustrate the model and simulate various route structures.

February 1973

17. Key Words	18. Distribution Statement
Modeling, Automated Guideway, Simulation, Dual Mode, Network	DOCUMENT IS AVAILABLE TO THE PUBLIC THROUGH THE NATIONAL TECHNICAL INFORMATION SERVICE, SPRINGFIELD, VIRGINIA 22151.

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
Unclassified	Unclassified	68	

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TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
DOT-TSC-OST-72-31		

4. Title and Subtitle	5. Report Date
MBTA RAPID TRANSIT SYSTEM (RED LINE) WAYSIDE AND IN-CAR NOISE AND VIBRATION LEVEL MEASUREMENTS	August 1972
	6. Performing Organization Code
7. Author(s)	8. Performing Organization Report No.
Edward J. Rickley, Robert W. Quinn	
9. Performing Organization Name and Address	10. Work Unit No.
Department of Transportation Transportation Systems Center Kendall Square Cambridge, MA 02142	R2519
	11. Contract or Grant No.
	OS207
12. Sponsoring Agency Name and Address	13. Type of Report and Period Covered
Department of Transportation Office of the Secretary Office of Noise Abatement Washington D. C. 20590	Final Report October 1971-June 1972
	14. Sponsoring Agency Code

15. Supplementary Notes

16. Abstract

Wayside and in-car noise and vibration characteristics of a late-model mass transit car making up 2-car and 4-car trains are tabulated and analyzed in this report. The MBTA Type 1 South Shore Rapid Transit Car, designed and built by Pullman Standard, Chicago, Illinois and currently in operation on the Red Line of the Massachusetts Bay Transportation Authority (MBTA) was measured.

Wayside measurements had been made by the tracks of the South Shore Extension of the Red Line 58 days after the official September 1, 1971 opening of this extension. These wayside measurements were repeated six months later.

In-car noise and vibration measurements are made in a selected 2-car train on a typical run over various sections of the Red Line.

February 1973

17. Key Words	18. Distribution Statement
Noise, Abatement, Noise Transportation, Noise and Vibration Transit Cars, Rapid	DOCUMENT IS AVAILABLE TO THE PUBLIC THROUGH THE NATIONAL TECHNICAL INFORMATION SERVICE, SPRINGFIELD, VIRGINIA 22151.

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TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
DOT-TSC-OST-72-33		

4. Title and Subtitle	5. Report Date
EXPERIMENTAL PLAN FOR CONDUCTING IONOSPHERIC SCINTILLATION MEASUREMENTS USING ATS GEOSTATIONARY SATELLITES AT 136 AND 1550 MHz	April 1973
	6. Performing Organization Code
7. Author(s) W.E. Brown III, G. G. Haroules and W. 1. Thompson III	8. Performing Organization Report No. DOT-TSC-OST-73-33
9. Performing Organization Name and Address Department of Transportation Transportation Systems Center Kendall Square Cambridge, MA 02142	10. Work Unit No. R-3559
	11. Contract or Grant No. OS-334
12. Sponsoring Agency Name and Address Department of Transportation Office of the Secretary Office of Telecommunications Washington, DC 20590	13. Type of Report and Period Covered June 1971 - March 1972 Interim Report
	14. Sponsoring Agency Code

15. Supplementary Notes

16. Abstract

An experimental plan for conducting ionospheric scintillation measurements using the geostationary Applications Technology Satellites at 136 MHz and 1550 MHz is presented. A remote unmanned data collection platform is proposed together with detailed design configurations and data collection and analysis procedures. The data collection platform provides a real time readout capability utilizing the ATS-1 or the ATS-3 satellites as a convenient radio relay link. A comprehensive literature search and bibliography are presented in support of the analysis which lead to the design of the remote data collection platform.

17. Key Words	18. Distribution Statement
Ionospheric scintillation AEROSAT Geostationary satellites Coherent modulation ATS	DOCUMENT IS AVAILABLE TO THE PUBLIC THROUGH THE NATIONAL TECHNICAL INFORMATION SERVICE, SPRINGFIELD, VIRGINIA 22151.

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
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1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
DOT-TSC-OST-72-35		

4. Title and Subtitle	5. Report Date
SUMMARY DATA FOR SELECTED NEW URBAN TRANSPORTATION SYSTEMS	November 1972
	6. Performing Organization Code
7. Author(s)	8. Performing Organization Report No.
Robert F. Casey	
9. Performing Organization Name and Address	10. Work Unit No.
Transportation Systems Center Kendall Square Cambridge, Massachusetts 02142	R3597
	11. Contract or Grant No.
	OP201
	13. Type of Report and Period Covered
12. Sponsoring Agency Name and Address	Final Report 8/71 - 5/72
Office of the Secretary Office of Systems Analysis and Information Washington, DC. 20590	14. Sponsoring Agency Code

15. Supplementary Notes

March 1973

16. Abstract

In this report a selected set of information is presented for the most advanced of the new, unconventional or innovative urban transportation systems. Capsulized are system and vehicle physical characteristics, performance capabilities, costs and availabilities. A functional classification was developed and each system was categorized according to type of service provided. A method for using this data in the development of transportation plans for metropolitan areas is outlined.

17. Key Words	18. Distribution Statement
New Urban Transportation Systems Urban Transportation System Classification	DOCUMENT IS AVAILABLE TO THE PUBLIC THROUGH THE NATIONAL TECHNICAL INFORMATION SERVICE, SPRINGFIELD, VIRGINIA 22151.

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
Unclassified	Unclassified	152	

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
DOT-TSC-OST-73-1		

4. Title and Subtitle	5. Report Date
ELECTROCHEMICAL POWER SOURCES FOR ELECTRIC HIGHWAY VEHICLES	June 1972
	6. Performing Organization Code
7. Author(s)	8. Performing Organization Report No.
J.H.B. George	C-74692
9. Performing Organization Name and Address	10. Work Unit No.
Arthur D. Little Inc. 25 Acorn Park Cambridge MA. 02140	OS314/R3531
	11. Contract or Grant No.
	TS-4044
	13. Type of Report and Period Covered
12. Sponsoring Agency Name and Address	Final Report June 1972
Office of the Secretary Office of the Assistant Secretary for Systems Development and Technology Washington, D.C. 20590	14. Sponsoring Agency Code

15. Supplementary Notes

16. Abstract This report summarizes an assessment of electrochemical power sources (batteries and fuel cells) which are relevant to electric vehicle propulsion. The developments reported herein have taken place since a previous assessment on the same subject was completed by Arthur D. Little, Inc. in 1968 for the U.S. Department of Health, Education and Welfare.

February 1973

17. Key Words	18. Distribution Statement
Transportation Electric Propulsion Batteries Fuel Cells Automobile	DOCUMENT IS AVAILABLE TO THE PUBLIC THROUGH THE NATIONAL TECHNICAL INFORMATION SERVICE, SPRINGFIELD, VIRGINIA 22151.

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
Unclassified	Unclassified		

TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
DOT-TSC-OST-73-3		

4. Title and Subtitle	5. Report Date
AIRPORT AND AIR SERVICE ACCESS	March 1973
	6. Performing Organization Code

7. Author(s)	8. Performing Organization Report No.
Richard de Neufville, Nigel Wilson, Harley Moore, III, Walter Gelerman, Uzi Landau and John Yaney	R72-35

9. Performing Organization Name and Address	10. Work Unit No.
Civil Engineering Systems Laboratory Department of Civil Engineering Massachusetts Institute of Technology Cambridge, Mass. 02139	05305/R3502
	11. Contract or Grant No. DOT-TSC-309
	13. Type of Report and Period Covered Final Report Sept 1971 - June 1972
12. Sponsoring Agency Name and Address Department of Transportation Office of the secretary Office of R&D Policy Washington, D.C. 20590	14. Sponsoring Agency Code

15. Supplementary Notes

16. Abstract The problems of airport and air service access are investigated in this report. Airport access, primarily an urban transportation system problem, is investigated using data obtained from the Cleveland-Hopkins Airport Access Study and other surveys and studies. The nature of airport access and of passenger behavior with regard to it is investigated to determine what governmental policies might be appropriate. Many of the factors that determine how passengers choose their access mode and, consequently, how they would use a new mode that might be provided cannot readily be affected by governmental action. Massive investment in access modes is not a cost-effective method of changing passenger flows to the airport; improvements in these modes should be of an operational nature.

Airport access is a subset of air service access; attention to problems of the latter may provide more chance to improve service for the air passenger. This study investigates two aspects of the air service access problem: air network configuration and the use of satellite airports. Using aggregate delay time as a measure of effectiveness, the most efficient network was found to be one in which traffic is concentrated, reducing network connectivity. However, tradeoffs between average quality of service & distributional effects must be considered in policy making. Satellite airports may seem to be a convenient means to improve access to air service in a region, but competitive economic forces discourage both airlines & air passengers from using satellite airports and impell them to concentrate at major terminals. Satellite or reliever fields will not be used significantly by air carriers without some form of governmental coercion.

17. Key Words	18. Distribution Statement
Airport access Air service access Satellite airports Air networks	DOCUMENT IS AVAILABLE TO THE PUBLIC THROUGH THE NATIONAL TECHNICAL INFORMATION SERVICE, SPRINGFIELD, VIRGINIA 22151.

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
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1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
DOT-TSC-OST-73-9		

4. Title and Subtitle	5. Report Date
A SUMMARY OF OPTIMIZATION TECHNIQUES THAT CAN BE APPLIED TO SUSPENSION SYSTEM DESIGN	March 1973
	6. Performing Organization Code
7. Author(s)	8. Performing Organization Report No.
J. Karl Hedrick	None
9. Performing Organization Name and Address Arizona State University School of Engineering Mechanical Engineering Facility Temple, Arizona 85281	10. Work Unit No. R3550 11. Contract or Grant No. OS335
12. Sponsoring Agency Name and Address Office of the Secretary Office of the Assistant Secretary for System Development and Technology Washington, D.C. 20590	13. Type of Report and Period Covered Final Report 14. Sponsoring Agency Code

15. Supplementary Notes

16. Abstract Summaries are presented of the analytic techniques available for three levitated vehicle suspension optimization problems: optimization of passive elements for fixed configuration; optimization of a free passive configuration; optimization of a free active configuration. The techniques are applied to a heave dynamic model which includes gravity forces, random aerodynamic forces and random guideways making use of penalty functions which include vehicle acceleration, suspension displacement, gap variation, power requirements.

17. Key Words	18. Distribution Statement
Vehicle Suspension Track Levitated Vehicles	DOCUMENT IS AVAILABLE TO THE PUBLIC THROUGH THE NATIONAL TECHNICAL INFORMATION SERVICE, SPRINGFIELD, VIRGINIA 22151.

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
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1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
DOT-TSC-OST-73-11		

4. Title and Subtitle	5. Report Date
INVESTIGATION OF JET NOISE USING OPTICAL HOLOGRAPHY	April 1973
	6. Performing Organization Code
7. Author(s)	8. Performing Organization Report No.
Richard F. Salant	DOT-TSC-146-2
9. Performing Organization Name and Address	10. Work Unit No.
Department of Mechanical Engineering Massachusetts Institute of Technology Cambridge, MA 02139	R-3530 /OS307
	11. Contract or Grant No.
	DOT-TSC-146
12. Sponsoring Agency Name and Address	13. Type of Report and Period Covered
Office of the Secretary Office of Noise Abatement Department of Transportation Washington, D. C. 20590	February - August 1972 Final Report
	14. Sponsoring Agency Code

15. Supplementary Notes

16. Abstract

Holographic interferograms have been made of cold, laboratory scale, supersonic air and nitrogen jets in the mach number range of 2.1 to 3.4, and of helium jets in the mach number range of 1.5 to 2.95. These holograms demonstrate that the acoustic field in the vicinity of such jets is dominated by mach waves, each of which can be traced back to a generating disturbance within the jet. The mach waves are generated from an axial position slightly downstream of the nozzle exit to a position near the tip of the potential core. Measurements of mach angle indicate that the average convection velocity of the generating disturbances in the air/nitrogen jet is approximately 84% - 90% of the jet velocity for the mach number range of 2.1 - 2.7, and approximately 77% of the jet velocity for the mach number range of 2.8 -3.4. The average convection velocity of the generating disturbances in the helium jet is approximately 67% of the jet velocity. The disturbances appear to be coherent instabilities rather than turbulent eddies, and extend into the potential core. Accelerometer measurements of nozzle vibration suggest that the disturbances originate upstream of the nozzle.

17. Key Words	18. Distribution Statement
Optical Holography Supersonic Jet Noise Mach waves	DOCUMENT IS AVAILABLE TO THE PUBLIC THROUGH THE NATIONAL TECHNICAL INFORMATION SERVICE, SPRINGFIELD, VIRGINIA 22151.

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
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TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
DOT-TSC-OST-73-14		

4. Title and Subtitle	5. Report Date
RESEARCH AND DEVELOPMENT OPPORTUNITIES FOR IMPROVED TRANSPORTATION ENERGY USAGE	September 1972
	6. Performing Organization Code: DOT-TSC-TMP

7. Author(s)	8. Performing Organization Report No.
Transportation Energy Panel	

9. Performing Organization Name and Address	10. Work Unit No.
Department of Transportation Transportation Systems Center Kendall Square Cambridge, MA 02142	R-3531
	11. Contract or Grant No.: OS-314
	13. Type of Report and Period Covered: Summary Technical Report
12. Sponsoring Agency Name and Address Department of Transportation Office of the Secretary 400 7th Street, S. W. Washington, D. C. 20590	14. Sponsoring Agency Code: DOT-OST-TST-14

15. Supplementary Notes

April 1973

16. Abstract The almost complete dependence of transportation systems upon petroleum products makes the transportation sector vulnerable to increased prices of petroleum or insecure sources of petroleum. Since the dependence of transportation upon imported petroleum is projected to increase substantially over the next two decades, both short-and long-term remedial actions should be initiated now and in the next few years because of the long time needed to bring about evolutionary changes in the Nation's transportation systems. Possible remedial actions include:

1. Technological improvements for more efficient use of petroleum by transportation.
2. Technological changes to permit greater use of non-petroleum energy resources by transportation.
3. Shift of transportation demand to more efficient modes from less efficient modes.
4. Reduction of demand for transportation services.

Transportation energy demand projections are given and R&D tasks in each of the first three categories are assessed.

17. Key Words	18. Distribution Statement
Transportation, Energy, Transportation Energy, Energy Utilization, Fuel Economy, Heat Engines	DOCUMENT IS AVAILABLE TO THE PUBLIC THROUGH THE NATIONAL TECHNICAL INFORMATION SERVICE, SPRINGFIELD, VIRGINIA 22151.

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
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TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
DOT-TSC-OST-73-16 I		

4. Title and Subtitle	5. Report Date
ANALYSIS OF DUAL MODE SYSTEMS IN AN URBAN AREA Volume I: Summary	April 1973 6. Performing Organization Code

7. Author(s)	8. Performing Organization Report No.
P. Benjamin, J. Barber, R. Favout, D. Goeddel, C. Heaton, R. Kangas, G. Paules, E. Roberts, L. Vance	DOT-TSC-OST-73-16

9. Performing Organization Name and Address	10. Work Unit No.
Department of Transportation Transportation Systems Center Kendall Square Cambridge, MA 02142	OS-318 11. Contract or Grant No. G4120

12. Sponsoring Agency Name and Address	13. Type of Report and Period Covered
Department of Transportation Office of the Secretary Office of Systems Engineering Washington, DC 20590	Final Report August 1971-August 1972 14. Sponsoring Agency Code

15. Supplementary Notes

16. Abstract

Various forms of Dual Mode transportation were analyzed in order to determine the economic viability of the Dual Mode concept. Specially designed new small Dual Mode vehicles, modifications of existing automobiles, and pallet systems, all operating in conjunction with Dual Mode buses, were examined. The study was conducted in a Boston 1990 scenario, in which an extensive Dual Mode system providing service for the entire urban region was presumed to exist. This study was not intended to be a proposal for Dual Mode in Boston. The following conclusions are considered to be generally applicable to other large urban areas as well: (a) Dual Mode systems appear to be sufficiently attractive to warrant further technological development; (b) for urban-wide applications, a Dual Mode system which includes both buses and personal vehicles is more effective than one consisting of either fleet of vehicles alone; (c) a Dual Mode transportation system benefits from the use of various Dual Mode concepts throughout its development. An effective first step would be to install a limited network Dual Mode minibus system, with capacity for ultimate growth to a longer guideway network with personal vehicles and buses.

17. Key Words	18. Distribution Statement
Urban Transportation Systems Dual Mode Systems	DOCUMENT IS AVAILABLE TO THE PUBLIC THROUGH THE NATIONAL TECHNICAL INFORMATION SERVICE, SPRINGFIELD, VIRGINIA 22151.

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
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TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
DOT-TSC-OST-73-19		

4. Title and Subtitle	5. Report Date
PREDICTION OF V/STOL NOISE FOR APPLICATION TO COMMUNITY NOISE EXPOSURE	May 1973
	6. Performing Organization Code

7. Author(s)	8. Performing Organization Report No.
Charles L. Munch	DOT-TSC-OST-73-19

9. Performing Organization Name and Address	10. Work Unit No.
Sikorsky Aircraft Division United Aircraft Corp. North Main Street Stratford, CT 06602	R-2519
	11. Contract or Grant No. DOT-TSC-438 OS-207
	13. Type of Report and Period Covered June 1972-Dec. 1972 Final Report
12. Sponsoring Agency Name and Address Department of Transportation Office of the Asst. Sec. for Sys. Development & Technology, Office of Noise Abatement TST-50 Washington, D.C. 20590	14. Sponsoring Agency Code

15. Supplementary Notes

Prepared Under Contract No. DOT-TSC-438, DOT-TSC, Cambridge, MA 02142

16. Abstract A computer program to predict the Effective Perceived Noise Level (EPNL), the tone corrected Perceived Noise Level (PNLT), and the A-Weighted Sound Level (dBA) radiated by a V/STOL vehicle as it flies along a prescribed takeoff, landing, or cruise flight path is described in detail and a complete users guide for the program is presented. The procedures used to predict the noise radiated by helicopter rotors, propellers, turboshaft engines, lift and cruise fans, and jets are described in detail. Helicopter rotor noise and jet noise are theoretically predicted with some empirical modifications while propeller, fan, and turboshaft engine noise is calculated with primarily empirical procedures. The program is designed to be easy to use; thus it should be useful in V/STOL-port planning studies.

There are major limitations of current technology on the use of the program; the noise of VTOL vehicles characterized by impulsive type noise signatures should not be predicted and, because there are not yet adequate methods for predicting the noise from deflected jets, augmentor wings, blown flaps, and the like, noise of augmented lift STOL aircraft cannot yet be predicted. There is, in fact, some evidence to indicate that the EPNL measure does not adequately predict the annoyance of impulsive noise signatures and it is hoped that improved measures to account for the annoyance of impulsive noise will be developed in the near future.

17. Key Words	18. Distribution Statement
Noise Abatement Aviation Sources, V/STOL Noise, Community Noise Exposure	DOCUMENT IS AVAILABLE TO THE PUBLIC THROUGH THE NATIONAL TECHNICAL INFORMATION SERVICE, SPRINGFIELD, VIRGINIA 22151.

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
Unclassified	Unclassified	280	

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URBAN MASS TRANSPORTATION ADMINISTRATION

DOT-TSC-UMTA-73-1

Development and Testing of a Completely Passive, Air Suspended, Air Propelled Personal Rapid Transit Vehicle,
by C. H. Smoot et al,
Final Report, April 1973 (Contractor Report)

Unlimited-Distribution Report

TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
DOT-TSC-UMTA-73-1		

4. Title and Subtitle	5. Report Date
DEVELOPMENT AND TESTING OF A COMPLETELY PASSIVE, AIR SUSPENDED, AIR PROPELLED PERSONAL RAPID TRANSIT VEHICLE	April, 1973
	6. Performing Organization Code
7. Author(s)	8. Performing Organization Report No.
Charles H. Smoot et al	DOT-TSC-UMTA-73-1
9. Performing Organization Name and Address	10. Work Unit No.
Uniflo Systems Company 7401 Washington Avenue South Minneapolis, Minnesota 55435	UM306/R3722
	11. Contract or Grant No.
	DOT-TSC-367
12. Sponsoring Agency Name and Address	13. Type of Report and Period Covered
U.S. Department of Transportation Urban Mass Transportation Administration Office of Research, Development & Demonstrations Washington, D.C. 20590	Final Report March, 1972 to August, 1972
	14. Sponsoring Agency Code

15. Supplementary Notes

16. Abstract

A prototype Uniflo vehicle base with mock-up superstructure was tested on 55 ft. of full-scale track.

Sound treatment to meet NCA 60 at 25 ft. from the guideway enclosure and within the vehicle was proposed and the costs determined.

A heating and cooling system using passive vehicle heat sink elements with station berth recharging was found desirable because of its lower cost and reliability.

An evaluation of the estimated production quantity costs for the vehicle base, guideway surface, levitation and thrust elements showed a reduction of 49% compared to previous design estimates.

Extensive tests confirmed the feasibility of the track based linear air turbine used for acceleration and service braking in the Uniflo PRT system,

Ride quality measurements indicated a need for improved secondary suspension.

Empty vehicle speeds over 20 ft./sec. and accelerations exceeding 5 ft./sec.^{2} were achieved with an air flow of 72.0 ft.^{3}/sec. Vehicle starting drag was less than 5 lbs. force.

17. Key Words	18. Distribution Statement
PRT (Personal Rapid Transit) Air Cushion Vehicles Passive Vehicle Circulation and Distribution	DOCUMENT IS AVAILABLE TO THE PUBLIC THROUGH THE NATIONAL TECHNICAL INFORMATION SERVICE, SPRINGFIELD, VIRGINIA 22151

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Contract Number

Cross Reference Sheet

Contract Number	Agency	Distribution	Report Number
DOT-TSC-130	NASA	Unlimited	DOT-TSC-NASA-72-2
DOT-TSC-146	OST	Unlimited	DOT-TSC-OST-73-11
DOT-TSC-203	FRA	Unlimited	DOT-TSC-FRA-72-12
DOT-TSC-213-1	NHTSA	Unlimited	DOT-TSC-NHTSA-73-3,II
DOT-TSC-251-4	NHTSA	Unlimited	DOT-TSC-NHTSA-73-3,III
DOT-TSC-309	OST	Unlimited	DOT-TSC-OST-73-3
DOT-TSC-367	UMTA	Unlimited	DOT-TSC-UMTA-73-1
DOT-TSC-378	FAA	Unlimited	DOT-TSC-FAA-73-1
DOT-TSC-379	FAA	Unlimited	DOT-TSC-FAA-73-3
DOT-TSC-393	FAA	Unlimited	DOT-TSC-FAA-73-8
DOT-TSC-409	NHTSA	Unlimited	DOT-TSC-409
DOT-TSC-438	OST	Unlimited	DOT-TSC-OST-73-19
TS-4044	OST	Unlimited	DOT-TSC-OST-73-1
FAA-217-0	FAA	Unlimited	DOT-TSC-FAA-72-32

PROCEEDINGS

DOT-TSC-OST-72-13
Climatic Impact Assessment Program: Proceedings of the Survey Conference, February 15-16, 1972,
by A.E. Barrington, Editor
Proceedings, September 1972

DOT-TSC-OST-73-4
Proceedings of the Second Conference on the Climatic Impact Assessment Program, November 14-17, 1972,
by A.J. Broderick, Editor
Proceedings, April 1973

DOT-TSC-OST-73-31
The Transportation Systems Center--A Special Briefing,
by W.C. Dunlap, Editor
Proceedings, February 1973

TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
DOT-TSC-OST-72-13		

4. Title and Subtitle	5. Report Date
CLIMATIC IMPACT ASSESSMENT PROGRAM, PROCEEDINGS OF THE SURVEY CONFERENCE, FEBRUARY 15-16, 1972	September 1972
	6. Performing Organization Code
7. Author(s)	8. Performing Organization Report No.
A. E. Barrington, Editor	DOT-TSC-OST-72-13
9. Performing Organization Name and Address	10. Work Unit No.
Department of Transportation Transportation System Center 55 Broadway Cambridge, MA 02142	R3537
	11. Contract or Grant No.
	OS-320
12. Sponsoring Agency Name and Address	13. Type of Report and Period Covered
Department of Transportation Office of the Assistant Secretary for Systems Development and Technology Washington, D.C. 20590	Conference Proceedings, February 15-16, 1972
	14. Sponsoring Agency Code

15. Supplementary Notes

16. Abstract

This volume contains the proceedings of a survey conference, held at the DOT Transportation Systems Center, which was the first of the reporting milestones of the Climatic Impact Assessment Program. CIAP, managed within the Office of the Secretary of Transportation, will assess, by report in 1974, the impact of climatic changes which might result from perturbation of the upper atmosphere by the exhaust effluent of a world high-altitude aircraft fleet, as projected to 1990.

The primary objective of this conference was to introduce the objectives and scope of CIAP to domestic and foreign representatives of industry, universities, and government agencies. Nineteen speakers were invited, at very short notice, to prepare informal introductory surveys in their respective disciplines which would be instructive to specialists in other areas and would illustrate the range of activities related to CIAP. These tutorials dealt with the general categories of engine emissions, the natural stratosphere, the physical and biological impact of stratospheric perturbations, and risk/benefit analysis. All but one of the talks are included in this volume, each followed by an abbreviated version of the ensuing open discussion.

17. Key Words	18. Distribution Statement
Climatic Impacts Engine Emissions Stratosphere	DOCUMENT IS AVAILABLE TO THE PUBLIC THROUGH THE NATIONAL TECHNICAL INFORMATION SERVICE, SPRINGFIELD, VIRGINIA 22151.

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
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1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
DOT-TSC-OST-73-4		

4. Title and Subtitle	5. Report Date
Proceedings of the Second Conference on the Climatic Impact Assessment Program	April 1973
	6. Performing Organization Code
7. Author(s)	8. Performing Organization Report No.
Anthony J. Broderick, Editor	DOT-TSC-OST-73-4
9. Performing Organization Name and Address	10. Work Unit No.
DOT Transportation Systems Center Kendall Square Cambridge, MA 02142	R3537
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	PPA OS 320
	13. Type of Report and Period Covered
12. Sponsoring Agency Name and Address	Conference Proceedings November 14-17, 1972
Office of the Secretary Department of Transportation 400 Seventh Street, S.W. Washington, D.C. 20590	14. Sponsoring Agency Code

15. Supplementary Notes

16. Abstract

This volume contains the proceedings of the Second Conference on the Climatic Impact Assessment Program (CIAP), held at the DOT Transportation Systems Center on November 14-17, 1972. It includes 37 invited papers, four unscheduled presentations, three edited panel discussions, and edited question-and-answer sessions following some of the papers. The conference was essentially a progress report on CIAP. Therefore, some of the papers contain new data not yet published elsewhere, others describe detailed experiment plans or hardware for use in the near future, and a few deal with proposed investigations which may be directly relevant to CIAP. The subjects covered include aircraft-engine emissions, the nature of the "undisturbed" stratosphere of 1974, the nature of the "perturbed" stratosphere of 1990-2025, the possible resulting tropospheric perturbations, and the biological and economic effects of such perturbations.

17. Key Words			18. Distribution Statement
ozone	atmospheric transport	NO_x	Document is available to the public through the National Technical Information Service, Springfield, Virginia 22151
emissions	atmospheric modeling	climate	
stratosphere	atmospheric dynamics		
SST's	chemical kinetics		
aerosols	ultraviolet radiation	sampling	
	photochemistry	pollutants	

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
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Technical Report Documentation Page

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
DOT-TSC-OST-73-31		

4. Title and Subtitle	5. Report Date
THE TRANSPORTATION SYSTEMS CENTER -- A SPECIAL BRIEFING	February 1973
	6. Performing Organization Code
7. Author(s)	8. Performing Organization Report No.
W. C. Dunlap, Editor	
9. Performing Organization Name and Address	10. Work Unit No. (TRAIS)
Department of Transportation Transportation Systems Center Kendall Square Cambridge MA 02142	G2130/YA 130
	11. Contract or Grant No.
12. Sponsoring Agency Name and Address	13. Type of Report and Period Covered
Department of Transportation Office of the Secretary Washington DC 20590	Proceedings 30-31 October 1972
	14. Sponsoring Agency Code

15. Supplementary Notes

Date of this page: July 1973

16. Abstract

The publication is an edited record of the 1-1/2 day proceedings, and a repository of information about how the Transportation Systems Center functions, its role in society, its staff capabilities, and its programs in transportation for fiscal years 1971, 1972, and 1973. Additionally, the center's procurement procedures and its financial picture are stressed.

17. Key Words	18. Distribution Statement
Transportation: Research and Development, Ground, Urban, Local, Security, Safety, Water, Air; Technology; Procurement	DOCUMENT IS AVAILABLE TO THE PUBLIC THROUGH THE NATIONAL TECHNICAL INFORMATION SERVICE, SPRINGFIELD, VIRGINIA 22151.

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Unclassified	Unclassified	130	

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