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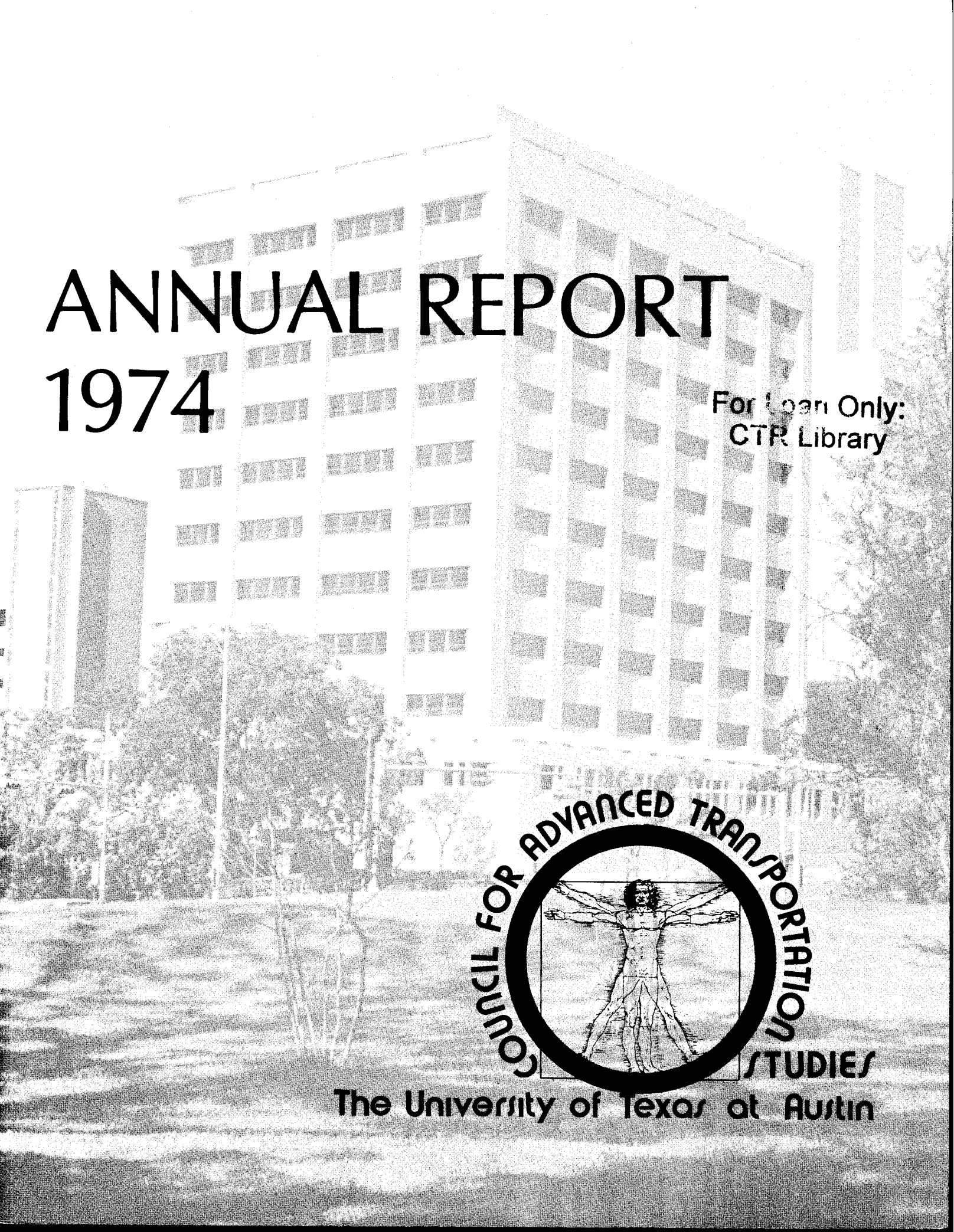


COUNCIL FOR ADVANCED TRANSPORTATION STUDIES

The University of Texas at Austin

PREFACE

"Coming together is a beginning, staying together is progress, working together is success."

-Henry Ford

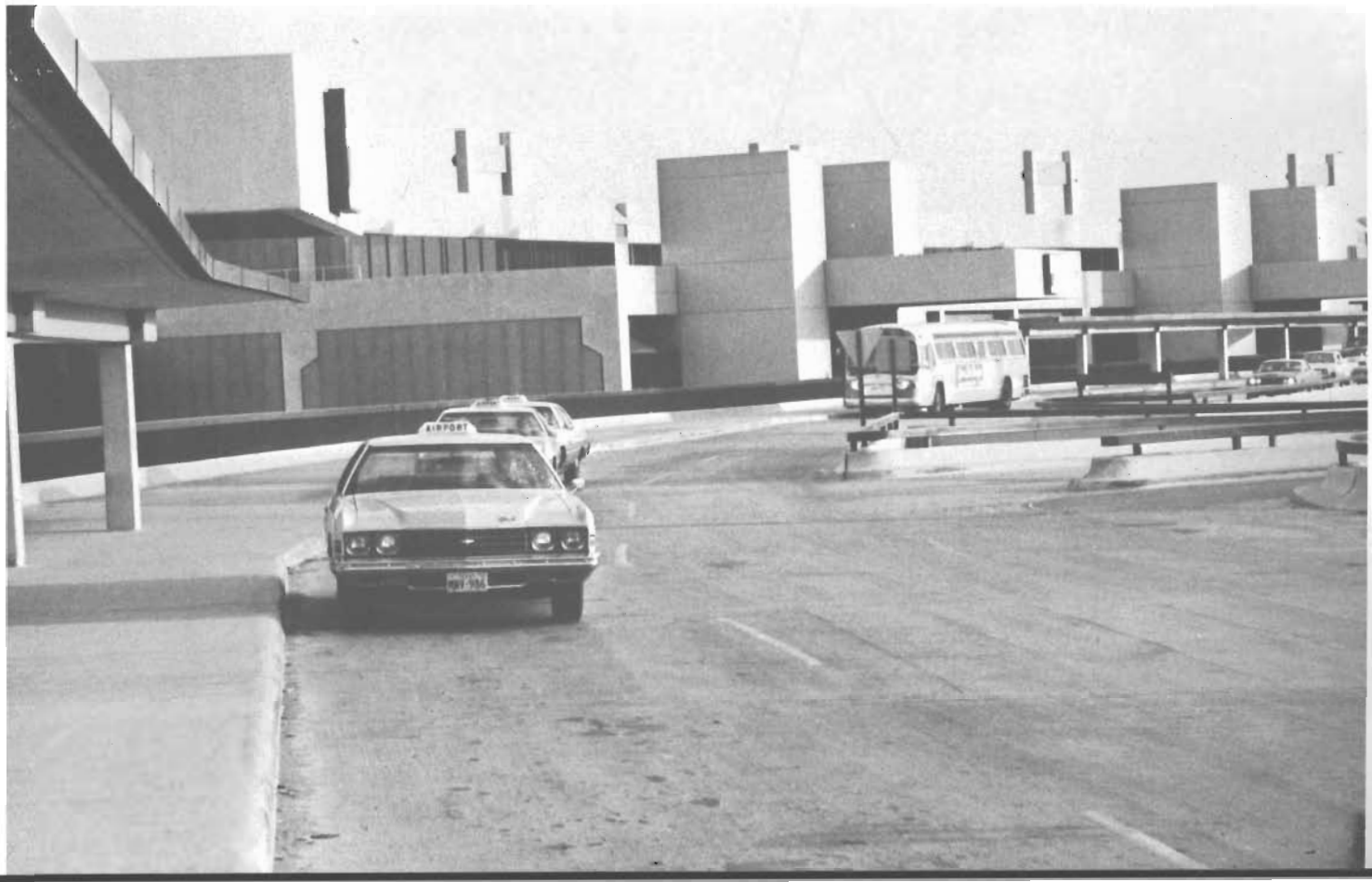
This quote by Henry Ford seems to outline both the goals and accomplishments of a multidisciplinary research program. During this past year we have continued accomplishments by this criterion. Our participating faculty continues to grow as do our contracts and publications list. The success of CATS is due to the interested, diligent participating faculty whose ideas, initiative, and scholarship make the cooperative program work; to the exceptionally fine central staff headed by Drs. John F. Betak and Grover Cunningham; and to the undergraduate and graduate students who are both a basic reason behind the program and one of the major outputs from it. Detailed work of these groups are discussed herein.

We appreciate the continued cooperation and support of the industrial and governmental agencies at local, state, and federal levels who have contributed to our program. Support and assistance has been provided by our Budget Advisory Committee and by the CATS Executive Committee. This support along with that of cognizant department chairmen is essential to the success of our program and is greatly appreciated.

W R Hudson

W. R. Hudson
Director of Research

CONTENTS



SUMMARY OF RESEARCH OBJECTIVES AND ACCOMPLISHMENTS

The purpose of the Council for Advanced Transportation Studies as well as its research goals and accomplishments are briefly stated as follows:

Mission or Purpose: The University of Texas Council for Advanced Transportation Studies (CATS) is a multidisciplinary organization formed to carry out research and educational programs in transportation. The program focuses on national, state and local transportation problems and provides an academic background for the development of professional careers in several fields of transportation. The Council provides a forum for faculty and student participation through close working relationships with industry and government agencies having common goals and interests in transportation education and research.

Research Goals and Objectives: The research division of the Council conducts multidisciplinary transportation research within The University and serves as a link between The University, industry, other universities and all levels of government for interaction on transportation problems. The Division of Research maintains awareness of the changing needs of the society by exchanging new transportation ideas with industry and government through meetings, conferences and seminars. A continuous effort is made by the Division to identify new transportation research possibilities for The University community, focusing on specific transportation needs to solve human problems.

Significant Accomplishments: The Council for Advanced Transportation Studies, Division of Research has in the past two years developed the largest multidisciplinary Transportation Research Program, funded under the University Research Program of the U.S. Department of Transportation. The function of the research outlined herein is to encourage multidisciplinary teams of researchers to attack transportation problems on a broad front. The University of Texas through the Council has a group of 73 faculty members from 25 disciplines in 10 schools and colleges who are interested in these problems.

In addition to this program, another project on vehicle noise studies has been funded by DOT through the Council, as is also the case for a study of low-cost Forest Service roads funded by the Forest Service. Two state inter-agency contracts have also been obtained, one through the Governor's Office, the other through the Austin State School of Mental Health-Mental Retardation. Because of our close ties with government and industry, several of our findings and proposals are currently being implemented.

Mr. Jim Seamon, Rail Transportation Specialist, Transportation Research Board, Washington, D. C., Commenting on Washington, D. C. Public Transit System during UT/A&M conference in October.

SELECTED HIGHLIGHTS DURING THE YEAR

*In May, the Council received a contract continuation at $375,000 from the Department of Transportation for research on "Transportation to Fulfill Human Needs in the Rural/Urban Environment." University contributed funds and services total $79,500.

*During the year CATS published 18 Research Reports, 18 Research Memos and 1 Miscellaneous publication. 16 papers were published by faculty related to the program, 15 oral presentations were made and 10 theses were produced under CATS sponsorship. A complete list of CATS publications is included herein.

*The Council hosted a two day seminar in March, 1974 on Department of Transportation University Research Program Projects with Iowa State University, George Washington University and the Department of Transportation. Topic Monitors from the Department of Transportation, students and officials from the State of Texas interacted with the two primary projects in the University Research Program, which are concentrating on the Transportation problems in the Rural Environment.

*A Seminar was held on "A Pavement Design System for Forest Service Roads" May 20-22, 1974. This included representatives from the U.S. Forest Service Regional Offices and Washington Headquarters who met with representatives from the Texas Highway Department, the Council for Advanced Transportation Studies and faculty from other universities.

Mr. Walter Wendlandt, former Director of Transportation, Texas Railroad Commission responds to questions at the UT/A&M Joint Conference on Transportation/Energy.

Mr. Byron Nupp, Assistant Director of Policy Review, U.S. Department of Transportation meets informally with Wayne Enders, doctoral candidate before a DOT briefing session.

*Principal Investigators from research topics on "Improvement of Intermodal Freight Transportation in the Southwest" and "Environmental Impact of Interurban Transportation Systems on Rural Communities," participated in a Department of Transportation conference in Washington, D.C. on "Transportation Problems of the Rural Environment." In addition, the Principal Investigator from the Topic on "Access to Essential Services" participated in a workshop on "Transportation and the Aged and the Handicapped" in Brooklyn, New York.

*A joint conference was held in October with Texas A&M. The theme of the conference was the "Long Range Implications of Scarce, Expensive Energy on Transportation." Over 100 people attended the conference. A proceedings will be published and submitted to various state agencies and organizations. The list of speakers and panelists was especially impressive, with 20 participants from federal, state, regional, and local agencies and private organizations. One measure of the significance attached to this conference by non-university individuals is that four U.S. Congressman attended some of the sessions, plus the Deputy Director of Research for the National Science Foundation and other similar individuals.

*In December a two day review session was held on the U.S. Department of Transportation University Research Program Project. This review saw the Assistant Director of the Office of Policy Review, the University Research Program Director, the Texas Project Monitor and two topic monitors interacting with the principal investigators, students, and personnel from outside agencies involved in the U.T. project, which is focused on the transportation problems in the rural environment. The DOT visitors also met with various University officials and the Council's Executive Committee during this time. The session resulted in an excellent exchange of ideas and information.

Foreign Recognition During the year several members of the group were invited to participate in foreign meetings, lectures and seminars.

*Dr. Anthony Healey, Associate Professor of Mechanical Engineering and corresponding principal investigator of the Topic entitled, "Evaluation of Riding Quality Factors in Multimodal Systems" presented a paper in August to "The International Colloquium on Field Simulation" in London, England.

*Dr. W. R. Hudson, Director of Research was invited to Utrecht Holland to serve as Principal speaker at the Annual Meeting of the Dutch Transportation Research Center. This meeting, attended by over 600, attracted participants from all Northern Europe. Dr. Hudson also presented lectures at the Technical University, Delft and conducted seminars for other organizations in Holland.

*Dr. Ronald Briggs, Assistant Professor of Geography met with faculty from the Department of Geography of Liverpool University while in Liverpool, England to discuss the multidisciplinary research program of the Council for Advanced Transportation.

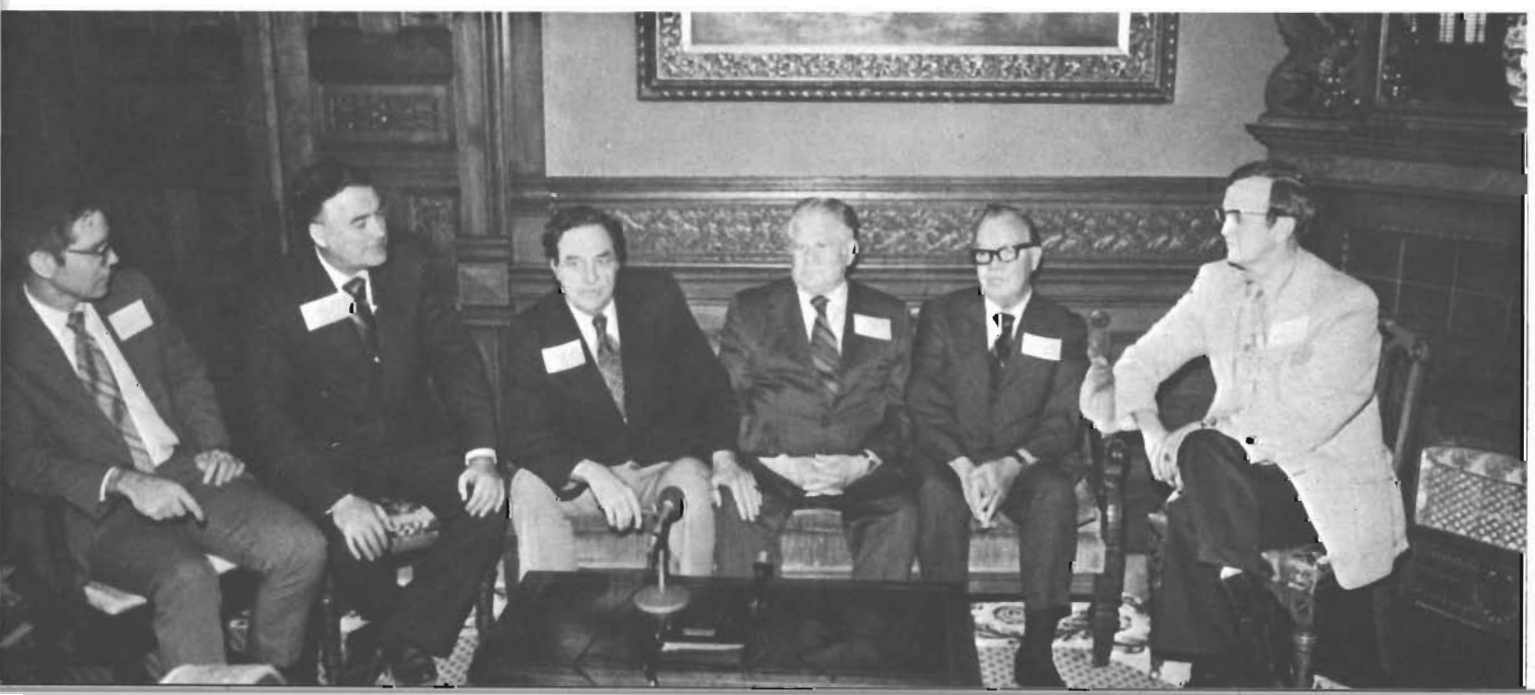
*In August 1974, Dr. W. R. Hudson presented several papers and lectures at the National Institute of Road Research in Pretoria, South Africa and at the Conference on Asphalt Pavements for South Africa in Durbin, South Africa. Combined attendance at the lecture and seminars totaled over 700 persons. On the return trip Dr. Hudson stopped at Brazilia, Brazil at the Geipot Research group and the University of Brazilia to discuss cooperation. These discussion led to Dr. Hudson's returning to Brazil in December to discuss the development of a large scale project on transportation systems.

*In December 1974, Dr. Pat Burnett, Assistant Professor of Geography, presented an invited paper to the Quantitative Commission meetings of the International Geographical Union in Palmerston North, New Zealand. Dr. Burnett also participated in discussions on the format and program for the 1976 IGU Congress to be held in Moscow, Russia.

*In June a joint Conference was held in Puebla, Mexico with the Regional Roads Association, the Mexican government and the University of Americas. Participants included Dr's. T.W. Kennedy, W. R. Hudson and B. F. McCullough.

*As a result of efforts to establish cooperative interaction with government and industry the Council received an interagency contract for $2,245 with the Governor's Office for Planning and Coordination and an interagency agreement with the Austin State School of the Texas Department of Mental Health and Mental Retardation for $2,190.

Dr. Harlan Smith, Chairman, Department of Astronomy; U.S. Representative Dale Milford, Texas; U.S. Representative Jake Pickle, Texas; U.S. Representative Olin Teague, Texas; U.S. Representative John Davis, Georgia; and Dr. W. R. Hudson, Council for Advanced Transportation Studies.



COUNCIL STAFFING

The research sponsored through the CATS Division of Research is presently staffed by full-time faculty members and students and a minimum of non-teaching staff. This is in keeping with the goals and objectives of the University and the DOT University Research Program to keep research related closely to academic programs. The project staff reports directly to the Office of the President through the Council's Executive Committee.

Dr. W. R. Hudson is Director of the Division of Research of CATS. Hudson is a Professor of Civil Engineering with teaching duties in Transportation. He also has solid administrative ability, as demonstrated by his experience as Associate Dean of Engineering and as Acting Director for the Center for Highway Research. Dr. John Betak joined the Council in May 1974 as Assistant Director of Research. Betak is a professional planner and geographer with several years experience in teaching, transportation research and research administration. He joined us from a position as Assistant Professor of Geography at McMaster University, Canada. Dr. Grover Cunningham joined the Council in November 1974 as Assistant Director for Social Science Research. Cunningham is a psychologist, lawyer, and certified public accountant. He has several years experience in research and research administration. Prior to joining us, Dr. Cunningham was president of Evaluation Research Associates, Inc., an Austin-based consulting firm.

The key research team consists of principal investigators from various disciplines as follows:

Dr. C. Michael Walton, Assistant Professor of Civil Engineering-Transportation,

Dr. Ronald Briggs, Assistant Professor of Geography,

Professor Robert Means, Professor of Law,

Professor Richard Dodge, Associate Professor of Architecture-Planning,

Dr. Mark Alpert, Associate Professor of Business-Marketing,

Dr. Stanley Arbingast, Professor of Business Administration-Director, Bureau of Business Research,

Dr. Anthony Healey, Associate Professor of Mechanical Engineering,

Dr. Pat Burnett, Assistant Professor of Geography,

Dr. William Dunlay, Assistant Professor of Civil Engineering,

Mr. Charles P. Zlatkovich, Research Associate, Bureau of Business Research,

Dr. Shane Davies, Associate Professor of Geography,

Dr. Alfred Smith, Professor and Director, Center for Communications Research,

Dr. Paul Jensen, Associate Professor of Mechanical Engineering,

Dr. James Fitzsimmons, Associate Professor of Management

Dr. Carol Deets, Associate Professor of Nursing,

Dr. Charles T. Clark, Associate Professor of Business Statistics,

Dr. Ronald Stearman, Professor of Aerospace Engineering and Engineering Mechanics,

Dr. Larry Hoberock, Assistant Professor of Mechanical Engineering,

Dr. C. C. Smith, Assistant Professor of Mechanical Engineering, and

Dr. Robert Young, Professor of Psychology.

RESEARCH ACTIVITIES

During this past year the breadth of the research activity has more than doubled in terms of number of projects. The variety of participation across the campus continues to increase.

The major effort of the Division of Research, Council for Advanced Transportation Studies, for the 1973-74 year has been the successful continuation of a $1,500,000 research program with the U.S. Department of Transportation.

In addition to the large DOT contract, a number of research efforts are also being conducted as follows:

(1) Vehicle Noise Studies - E. L. Hixson, Electrical Engineering

(2) A Study of Low-Cost Forest Service Roads - W. R. Hudson, Civil Engineering, B. F. McCullough, Civil Engineering

(3) "Research to Devise a Plausible Scenario for the Development of a Comprehensive Transportation System" by Robert Mather, Architecture

(4) "Transportation Services for the Mentally Retarded" by Shane Davies, Geography and John Carley, Austin State School

(5) "Gasoline Retailers Right of Survival" by James Treece, Law

(6) "Energy Crisis and Its Effect on Texas Highway Accident Experience" by C. M. Walton, Civil Engineering and Edward Frome, Business

(7) "Analysis of Effectiveness of Transportation Alternatives" by Sandra Rosenbloom, Community and Regional Planning

(8) "Interagency Contract for the Governor's office for Educational Research and Planning," by Dr. Ronald Briggs, Geography

Abstracts of all these projects are included below.

U.S. Department of Transportation Contract "TRANSPORTATION TO FULFILL HUMAN NEEDS IN THE RURAL/URBAN ENVIRONMENT"

Problem Statement Several areas of the United States can be characterized as rural or sparsely populated in which exist large, widely spaced urban centers. Texas for example, has an area of 267,000 square miles, 11 million people and contains 25 Standard Metropolitan Statistical Areas with 6 urban areas exceeding 250,000.

These rural/urban areas include not only the Southwest but portions of the Southeast, Midwest, and Farwest. These regions face not only the typical problems associated with travel in dense urban areas, but also the problems of intra-rural and inter-urban travel. Thus, the importance of a balanced transportation system takes on special significance in such an environment.

Transportation research and development should be directed toward solving human problems. In the past, new technology has sometimes been applied without adequate consideration of human needs. It is now essential that we carefully consider human needs in the development of transportation systems for the 1970's and 1980's, particularly with regard to personal mobility and with regard to the movement of goods and related essential services.

A large, well-directed, multidisciplinary university program can assist with these efforts by bringing together well-balanced, critical-sized multidisciplinary teams of faculty and students to study the problems and to interact with state and local governments and industry in defining and solving them. The training of college graduates in the transportation field is of crucial importance to this issue.

This project is establishing a broad basis for continuing interaction and research in transportation with industry and local, state, and federal government agencies. As outlined above, a general theme has been selected for developing a program of research which will help solve long-range problems, while at the same time providing immediate useful results for the sponsors.

The broad objective of the program is to solve problems with the sponsors and cooperating agencies related to human needs and transportation needs in the rural/urban environment as typified by the great Southwest. That is to

say that a variety of research can be accomplished keeping in mind the needs of both the urban and the rural traveling public. In this second year, the program has expanded to a group of six objectives as outlined below.

A series of 18 reports, 18 Research Memos and several other documents have been produced by this project. These are summarized in the section on publications.

Access to Essential Services (Topic I) The concern here is with the role of transportation in providing accessibility to essential services for the rural and needy populations, both emergency and ongoing. Emergency services include fire and police protection and emergency medical assistance. Ongoing services include education, social and rehabilitation services, and health care.

Inequality in the availability of essential services between rural and urban areas is being studied. The inequality is probably a consequence of the inability of the dispersed rural population to generate a tax base or a demand concentration sufficient to provide a dense network of facilities. However, transportation techniques must be developed to make essential services available to the rural and needy populations.

Existing research is deficient because of its failures to consider the interrelationships of essential services and to recognize the complete interdependencies between the demand for essential services, the demand for transportation, the location of the population, and the location of service facilities. Present studies have not adequately considered the viability of such innovative approaches as regional service centers or mobile facilities.

The research strategy comprises three major subsections. In the first year, the spatial demand for transportation, as derived from the demand for services themselves, was studied. Secondly, alternate systems of supply are being generated. Thirdly, an evaluatory capability for determining the viability and relative efficiency of alternative supply systems will be developed using cost-benefit and spatial-allocation models. Throughout the study, a variety of disciplines are involved.

Environmental Impact of Interurban Transportation Systems on Rural Communities (Topic II) It is essential to develop skill in evaluating and perhaps influencing the potential for growth and development of rural communities to generate new vitality. This vitality is essential if the flow of residents from rural to urban America is to be checked or reversed.

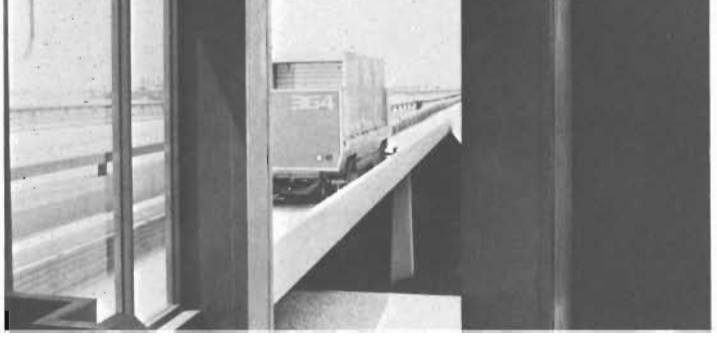
This research is directed at developing a quantitative model capable of expressing a rural community's potential for growth and development as influenced by the connectiveness of the community to inter-urban transportation systems.

Using selected communities in Eastern Texas and locally available sources of data, a predictive model relating the variables in three descriptive models will be formed. This model will provide the information necessary to reasonably anticipate the direction of future growth and development.

The second year's research is focusing on formulation of a preliminary hypothesis describing how and to what extent changes in the social and political characteristics of a community may interact with changes in transportation to alter and direct a rural community's opportunity for growth and development.

Intermodal Freight Transportation in the Southwest (Topic III-A) The purpose of this topic is to determine ways in which intermodal freight transportation in the Southwest can be improved. During the first year the study focused on the Dallas-Fort Worth Economic Area, designated by the U.S. Office of Business Economics consisting of 24 counties in Texas and two in Oklahoma. In the second year the study is being expanded to include Arkansas, Louisiana, Oklahoma, and Texas, designated as the West South Central states by the U.S. Bureau of Census. In addition to this effort, legal research is being undertaken on three aspects of air and rail transportation in Texas. Specific recommendations have been published regarding improved freight transportation and modernized rail lines. Further work along these directions is in process.

Monitoring the Effects of the Dallas-Fort Worth Regional Airport (Topic III-B) The major goal of this research topic is the development of a detailed plan for monitoring the impacts of a major new transportation facility, the Dallas-Fort Worth Regional Airport. Two types of impacts



Baggage mover system Dallas-Fort Worth Airport.

are of particular interest in this research: (1) impacts on the growth of the Dallas-Fort Worth SMSA, and (2) impacts of the new airport on the transportation patterns in the Dallas-Fort Worth Economic Area and in the Southwest.

The first task has two major goals:

(1) to develop measurement techniques to isolate a few key variables describing the effects of airport investment on the SMSA, and to analyze the inter-relationships between the variables over space and time; and

(2) to develop models of the kinds of conflict which arise between governmental agencies, large corporate industries and residential property owners over the development of land in the vicinity of the airport, together with models of the decision processes whereby such conflicts are resolved and generate urban growth and change.

The second task is concerned with developing preliminary models for estimating changes in the ground transportation patterns. These models will be made more sophisticated by including:

(1) changes in ground modal split caused by the new airport location and the availability of new transit facilities such as SURTRAN and or U—TACV,

(2) shifts in mode choice between air and ground modes for regional intercity transportation caused by the new airport locations,

(3) changes in trip generations due to changes in the numbers and types of airline flight schedules available, and

(4) changes in trip distribution resulting from land-use changes as studied in Task 1 of this research topic.

Evaluation of Riding Quality Factors in Multimodal Systems (Topic IV) A great deal of information is needed by way of evaluation to determine what the transportation user likes or dislikes about a particular ride or a particular mode of transport. A two-pronged attack on this problem is proposed.

Improvement of the transportation facilities is necessary for the continued development of any region. A stated goal of the Texas State and Regional Planning Boards is to "develop a balanced transportation systems for the regions by combining various modes of travel and technologies for the maximum convenience and efficiency and minimum confusion and congestion in the movement of people and goods."

Movement of people assumes a system to provide safety and convenience with reasonable comfort. In an area such as the Southwest, major centers separated by distances of 200 miles or so are frequent and travel times with new modes of ground transportation of two hours and more may be expected. A high-quality ride for that time duration is essential if popular use of any system is to be maintained.

The major objectives of the work described are to analyze existing ride quality criteria in use for all modes, to seek a common basis, and to determine if and to what extent a common set of criteria can be used for the dual purposes of guideway and vehicle design. These criteria are to be evaluated in relation to the human attitude responses about ride quality. The common set will then be used in studies of T.A.C.V. and lower speed pneumatic tire vehicle systems so that design criteria may be established for

(1) pavement or guiding surfaces,

(2) controlled suspension and steering subsystems, and

(3) overall system controls.

Student volunteers assist in field testing ride quality evaluation criteria.

Mr. Ray Weil, U.S. Department of Transportation; Dr. John Shortreed, Civil Engineering; and Dr. Mark Alpert, Marketing discuss research on Modal Choice Decisions.

Human Response in the Evaulation of Modal Choice Decisions (Topic V) Based on an evaluation of existing modes, using key determinant procedures, several types of work are in progress.

(1) Recommendations will be proposed to Austin Transit for implementation into the system.

(2) Further refinement of the measures, key determinant attributes, found during the first year of study will be made: with special attention given those attributes which local authorities are interested in acting upon.

(3) Longitudinal studies of changes in attributes toward determinant attributes, transit funding, etc. will be undertaken. Such studies will include an extension of the first year's work to the study of AMTRAK in Texas and the Southwest.

(4) Various analytical procedures (e.g., factor analysis, regression analysis, etc.) will be used to investigate changes in attributes of transportation modes and promotional messages to effect rider and voter responses.

OTHER PROJECTS

Project: **A Study of Low-Cost Forest Service Roads**

Co-Principal Investigators: W. R. Hudson, C.E., B. F. McCullough, C.E.

Research Assistant: Tom McGarragh

Sponsor: U.S. Forest Service

Completion: August 1974

Funding: $19,600 A two year extension totaling $50,000 is under negotiation at this time.

The National Forest Service maintains over 200,000 miles of roads throughout the United States. These low volume roads—ranging from narrow, unsurfaced roads to two lane asphalt concrete, paved roads—serve as access roads to recreational and timber land areas. In addition to these, another 136,000 miles of Forest Service roads are planned for construction in future years. Because of the difficulty involved in efficiently designing and maintaining road pavements in such an extensive system, the National Forest Service is sponsoring a research project with the objective of developing and implementing a working pavement design and management system for lowcost roads, in particular Forest Service roads.

The first year of this project was devoted to the formulation of a preliminary conceptual system. To do this it was necessary to study the parameters and constraints involved in the problem. Therefore, a comprehensive literature review to gather necessary background material was initiated and is now complete. In addition to this literature review, extensive interaction between Forest Service personnel and the project staff has been required, in the form of field visits and project conferences to discuss some of the many complexities of the problem. With the synthesis of information the preliminary conceptual system will be developed.

If, after its presentation, this conceptual system is accepted by the Forest Service there will be an opportunity to renew the program with Phase 2 of the project—the development of the actual pavement design and management system, including mathematical models and other information that is needed for optimization. This will then be followed by Phase 3 the preparation of training

Regional representatives of the U.S. Forest Service meet with Highway Department officials and faculty from CATS and other universities to exchange information for development of low-cost Forest Service Roads.

materials and implementation of the design and management system on a trial basis in a selected Forest Service management area. Negotiations are now under way.

Project: **Vehicle Noise Studies**

Senior Principal Investigator: Elmer Hixson, E.E.

Principal Investigator: Doug Reynolds

Sponsor: Department of Transportation

Proposed Completion: December 1974

Funding: $41,830 for 18 months

A new method of vehicle noise measurement that compensates for microphone-vehicle distance and gives source directivity is being used to isolate noise sources and modes of radiation. This information will be used for developing noise reduction techniques. To determine a better human response model, temporal and statistical properties of vehicle generated noise will be used in addition to the traditional weighted averaged sound pressure levels.

A goal of the subjective reactions study is to develop a response-based model which will allow the determination of an optimal acoustical environment. Field data will be collected to determine the predictive contribution of several engineering indices to the response-based classification model. Thus, the overall product of the study will be a measurement system able to precisely describe both the physical characteristics of transportation noises and subjective psychological reactions to them as well. To do this semantic differential techniques will be employed in order to develop a classification model of subjective responses to transportation noise. Then the signal parameters which affect subjective responses to the noise will be investigated in laboratory settings. Finally, the relative utility of several acoustical measurement techniques as predictors of the subjective classification model will be determined in field settings.

Project: **Analysis of Effectiveness of Transportation Alternatives**

Principal Investigator: Sandra Rosenbloom, Community and Regional Planning

Sponsor: Council for Advanced Transportation Studies

Completion: December 1974

Funding: $2,650

In January 1974, at the request of The University ad hoc Energy Conservation Committee, the Graduate Program in Community and Regional Planning undertook a survey of the full-time faculty and staff of The University to determine their interest in both carpooling and bus alternatives to their usual mode of home-to-work travel. Over 65% of the slightly under 10,000 persons surveyed returned completed questionnaires. A special program was written to collect and analyze these data. Three separate carpooling matching routines were run for the University community.

The research is focussed on two problems (1) evaluation of the effectiveness of the carpool matching service, and (2) an analysis of the need for special bus services. The first part is essentially a concern for short-term immediate improvements directly attributable to the matching of interested carpoolers. This study has a three-part design: (1) a "before-and-after" survey of vehicle occupancy and traffic congestion in the immediate University location, (2) a sample survey of those who indicated carpool interest to determine what actually happened to their usual travel patterns, and (3) an investigation of the personal and social constraints inhibiting the use of alternative transportation modes for University personnel.

The second major part of this topic involves a detailed analysis of the questionnaire responses indicating interest in special bus services. Several bus options are being investigated, using the survey data to set the parameters, for a project to study the effectiveness of proposed systems such as demand-activated transit, subscription home-to-work services, and new bus routing.

Project: **A Plausible Scenario for the Development of a Comprehensive Transportation System Using the Austin-Travis County Area As An Illustrative Case**

Principal Investigator: Robert Mather, Architecture

Sponsor: Council for Advanced Transportation Studies

Completion: January 1975

Funding: $2,160

Since 1971, the P.I. has been developing an economical and comprehensive methodology for understanding the future implications of planning and technological decisions being made or considered in the present. This work has postulated, in a quantitative and qualitative sense, the performance of the total environment of Austin-Travis County in the mid 21st century. Working backward from this 21st century environment, the P.I. produced a plausible scenario of development involving both the public and private sector of the economy.

This topic is paraphrasing this material into transportation system terms and then pushes this aspect of the project to yield a chart which displays for the next seventy-five years (more or less) a plausible development sequence for an Austin-Travis County transportation system. The particular focus in this effort is on two facets: (1) human problems and the role of transportation in solving them, and (2) the influence on the environment of both physical and operational changes in transportation. Topics I, II, and V of the main DOT project are providing inputs into this research effort.

Project: **Transportation Services for the Mentally Retarded**

Co-Principal Investigators: C. Shane Davies, Geography, and John Carley, Austin State School

Sponsor: Council for Advanced Transportation Studies and Austin State School

Completion: December 1974

Funding: $3,690

Within the past three years, the traditional concept of habitation for the mentally retarded has been seriously challenged, if not replaced, by the principle of normalization. In implementing the principle of normalization, representatives from the Texas Department of Mental Health and Mental Retardation in cooperation with parents and representatives from all agencies serving the mentally retarded in Travis County, conducted a survey to determine the services required to meet the needs of the mentally retarded. This committee, as a result of this effort, endorsed transportation as the priority service due to its interrelatedness with all other proposed and existing services.

This topic is concerned with the examination of the factors that influence transportation within the context of normalization as it relates to the mentally retarded in Travis County. The mentally retarded referred to in this topic are categorized as those individuals who demonstrate a potential for community living.

Therefore, the intent of this research project is to provide: (1) a detailed delineation of the problems created by the present transportation system, (2) an in-depth literature review to obtain a global frame of reference to the problem, (3) a training curriculum in transportation, and (4) to implement specific recommendations so that the lives of the retarded will no longer be defined by a transportation system.

Principal Investigators such as Dr. Shane Davies, Geography meet frequently with project team members to discuss research progress.

Project: **Gasoline Retailers' Right to Survival**

Principal Investigator: James M. Treece, Law

Sponsor: Council for Advanced Transportation Studies

Completion: January 1975

Funding: $2,000

The production and transportation to refineries of a scarce resource, petroleum, can be regulated and its refinement controlled by a small number of interdependent firms and regulatory agencies. On the other hand, the task of distributing the end product to consumers, with its attendant risks and small profit margins, can be shifted to small businesses who invest in the property, equipment, and personnel needed for the retail function.

The law of franchising permits refiners to induce independent business-persons to invest in the retail outlets without at the same time guaranteeing them the freedom of decision about products, prices, and services. Refiners require, and the law permits them to require, heavy dependence from their "independent" co-enterprisers. But when times change, refiners willingly seize upon the label "independent" to terminate trade relationships with their licensee.

Project: **Energy Crisis and Its Effect on Texas' Highway Accident Experience**

Co-Principal Investigators: Edward Frome, Statistics-Operations Research and C. Michael Walton, Civil Engineering

Sponsor: Council for Advanced Transportation Studies

Completion: January 1975

Funding: $2,850

There is wide acceptance that the energy crisis, which led to the maximum legal speed of 55 miles per hour on Texas Highways, has had a significant effect on accident experience. In fact, statements have been made that the number of accidents and fatalities have been greatly reduced.

This topic is investigating the severity of accidents on rural Texas Highways "before" and "after" the change in legal speed limits. Highway accidents are being classified as fatal, injury, or property damage only accidents. The study is investigating the change in accident severity and types that occurred on specific highway classes, i.e., interstate, primary secondary, and state system. A regression model is being used for this analysis. However, the usual regression techniques are being modified under the assumption that accidents are poisson-distributed, with the expected value defined by the regression model.

Project: **Where the Buses Are**

Co-Principal Investigators: Wayne Danielson, Dean College of Communication Alfred Smith, Director Center for Communications Research, and Charles Watkins, Research Associate

Sponsor: Council for Advanced Transportation Studies

Completion: June 1975

Funding: $5,000

Fuel shortages, urban congestion, and pollution increase the importance of getting the public to use mass transportation. Middle and upper class patrons of public transportation are more likely to be casual users, with an emphasis upon non-peak hour times. It has been observed in studies in Pittsburgh, that casual riders need more information about bus schedules than is normally available if they are to use this form of public transportation.

The focus of this topic is to increase the patronage of casual, non-peak hour, middle class riders of buses. The overall study is divided into four phases. Only the first phase is being developed now. This is essentially a feasibility study designed to test various forms of visual displays on cable television. A series of questions are being investigated before subsequent phases are proposed and developed. These questions include: (1) should the information on where the buses are be displayed next to the time and temperature information on cable television or on some separate channel?; (2) If the schedule display is presented with time and temperatures, should it appear at the end of the scan or in the middle?; (3) Which kinds of displays are most effective with middle and upper class patrons?; and so on. This task is closely coordinated with Topic V of the DOT project.

THE COUNCIL FOR ADVANCED TRANSPORTATION STUDIES THE UNIVERSITY OF TEXAS AT AUSTIN

ANNOTATED BIBLIOGRAPHY OF PUBLICATIONS 1973-74

RESEARCH REPORTS

RR 1 Briggs, Ronald, Wayne T. Enders, James A. Fitzsimmons and Paul Jensen, **Access to Essential Services: Analyzing the Existing System,** April 1974. (DOT-OS-30093 I-1)

This report is a compilation of first year results from a three year research effort entitled, "Access to Essential Services in the Rural/Urban Environment." This report covers problem areas in service availability, a literature overview, the existing system, demand modeling, and data systems.

RR 2 Skorpa, Lidvard, Richard Dodge, C. Michael Walton and John Huddleston, **Transportation Impact Research: A Review of Previous Studies and a Recommended Methodology for the Study of Rural Communities**, March 1974. (DOT-OS-30093 II-1)

In this report the authors briefly define and classify methodologies used in transportation impact studies, summarize in detail previous research findings according to type of impact investigated, comment on usefulness and limitations of previous studies and propose strategy for future research.

RR 3 Skorpa, Lidvard, Richard Dodge and Michael Walton, **Land Value Modeling in Rural Communities**, June 1974. (DOT-OS-30093 II-2)

This report develops indices for transportation and community related factors to be used in regression analysis with land value as the dependent variable. The techniques developed are applied to data from Sealy, Texas. It discusses why land values can be used as an indicator of community impact and evaluates a technique for modeling land values in a small town.

RR 4 Robinson, Eugene, **An Inventory of Freight Transportation in the Southwest Part I: Major Users of Transportation in the Dallas-Fort Worth Area**, December 1973. (DOT-OS-30093 III-1)

The author measures efficiency of the freight transportation system of the Dallas-Fort Worth areas as to how adequately natural and contrived fluctuations in demand over time are met.

RR 5 Adair, J. Bryan and James S. Wilson, **An Inventory of Freight Transportation in the Southwest Part II: Motor Common Carrier Service in the Dallas-Fort Worth Area**, December 1973. (DOT-OS-30093 III-2)

This report discusses the development of motor freight service in the Dallas-Fort Worth area; inventories common carriers of general freight and specialized truck carrier operations.

RR 6 Adair, J. Bryan, **An Inventory of Freight Transportation in the Southwest Part III: Air Freight Service in the Dallas-Fort Worth Area**, June 1974. (DOT-OS-30093 III-3)

This report focuses on the Dallas-Fort Worth area, a Texas distribution and collection center for freight. During the past ten years air cargo volumes have increased more than would be expected on the basis of population growth alone. This report, along with the previous two in the set will lead to recommendations for improving freight transportation in the Southwest.

RR 7 Chipman, William D., Harry Wolfe, and Pat Burnett, **Political Decision Processes, Transporta-**

tion Investment and Changes in Urban Land Use: A Selective Bibliography With Particular Reference to Airports and Highways, March 1974. (DOT-OS-30093 IIIB-2)

This bibliography deals with revision and extension of intra-urban location theory explaining how groups and individuals affect change in intra-urban land use in the vicinity of new transportation facilities. Special attention is focused on new airports in rural/urban fringes.

RR 8 Wolfe, Harry, **A Preliminary Analysis of the Effects of the Dallas-Fort Worth Regional Airport on Surface Transportation and Land Use**, April 1974. (DOT-OS-30093 IIIB-3)

This report describes some preliminary effects of the Dallas-Fort Worth Regional Airport on the transportation and land use systems of Denton, Dallas and Tarrant counties in Texas. The first part examines the effect of the airport on the highway network and public transportation. The second deals with the airport's impact on industrial, commercial and residential development.

RR 9 Burd, Gene, **Dissemination of Information to Increase Use of Austin Mass Transit: A Preliminary Study**, October 1973.

The relationship of information to mass transit usage in Austin, Texas is the focus of this report. Air pollution and the energy crisis brought buses into the limelight since Austin is primarily an automobile city. Effects of media coverage, public education, special transit services on bus ridership are discussed, and recommendations made on ways to improve bus service in Austin.

RR 10 Rosenbloom, Sandra, Jane S. Greig, and Lawrence S. Ross, **The University of Texas at Austin: A Campus Transportation Survey**, August 1973.

This report presents a preliminary analysis of the circulation and travel habits of The University of Texas campus.

RR 11 Rosenbloom, Sandra, and Nancy Shelton Bauer, **Carpool and Bus Matching Programs for the University of Texas at Austin**, September 1974.

This paper describes a study done for the President's ad hoc Energy Conservation Committee which provided assistance in the development of effective contingency plans and meaning for transportation alternatives for University personnel. A program was designed for the administration of a carpool and bus matching survey and program and the results are presented in this paper.

RR 12 Hudson, W.R., and Thomas G. McGarragh, **A Pavement Design and Management System for Forest Service Roads: A Conceptual Study**, July 1974.

This paper is the final report for Phase I of a projected three-phase study being conducted for the Forest Service by the Council for Advanced Transportation Studies. The purpose of the project is to develop and implement a pavement design and management system for low-volume roads, in particular, Forest Service Roads.

RR 13 Bolding, Randall, Anthony Healey, and Ronald Stearman, **Measurement of Roadway Roughness and Motion Spectra for the Automobile Highway System**, December 1974.

The present study is designed to support an overall program for the evaluation and establishment of ride quality criterion in transportation systems. This investigation, which is restricted to the automobile, outlines the procedures and equipment employed to measure, record and analyze automotive vibrations and highway or roadway roughness.

RR 14 Healey, Anthony J., Craig C. Smith, Ronald O. Stearman, and Edward Nathman, **Dynamic Modelling for Automobile Acceleration Response and Ride Quality Over Rough Roadways**, December 1974.

This research report evaluates vibration accep-

tance criteria for use in both vehicle systems design and guideway specification as the first part of a study of automobile riding quality.

RR 15 Gorse, Mary Lee Metzger, **A Forecast of Air Cargo Originations in Texas in 1990**, November 1974.

Air cargo originations in Texas have been forecasted to 1990 using two approaches: multiple regression analysis and trend analysis. A "best" forecast has been selected, based on all the statistical evidence available, which is a set of nine economic indicators.

RR 16 Sparks, John, Carl Gregory, Jose Montemayor, **A Description of the Application of Factor Analysis to Land Use Change in Metropolitan Areas**, December 1974.

The present investigation describes how factor analysis may be used to investigate land use changes by census tract following a major change in transportation. This report concerns the first of three research stages, a factor analysis of land use before major transportation investment in 1960.

RR 17 Davies, C. Shane, and John W. Carley, **The Transportation Problems of the Mentally Retarded**, December 1974.

This study identifies the travel problems experienced by the educable retarded and the instruction necessary for improving their mobility and environmental awareness.

RR 18 Burnett, Pat, John Betak, David Chang, Wayne Enders, and Jose Montemayor, **Transportation-Related Constructs of Activity Spaces of Small Town Residents**, December 1974.

This report is an initial step in the attempt to develop a model for predicting how different groups in small urban areas will respond to proposed or actual changes in the interurban transportation system.

RESEARCH MEMORANDA

RM 1 Davies, C. Shane, Mark Alpert, and W. Ronald Hudson, **Human Response in the Evaluation of Modal Choice Decisions**, April 1973.

This memo describes proposed research which will attempt to evaluate existing modes of transportation mixes available for urban/rural travel in terms of current user/non-user perceptions for each mode.

RM 2 Briggs, Ronald, Charlotte Clarke, James Fitzsimmons, and Paul Jensen, **Access to Essential Services**, April 1973.

This memo describes proposed research concerned with the contribution transportation systems can make to the provision of essential services in rural areas.

RM 3 Wooldrige, D.W., A.J. Healey, and R.O. Stearman, **Psychological and Physiological Responses to Stimulation**, August 1973.

A major impediment in the design of transportation systems is the opinion that the passenger has about his ride comfort. This Research Memo discusses the passenger's neurological response to stimulation.

RM 4 Zlatkovich, Charles P., **An Intermodal Transportation System for the Southwest: A Preliminary Proposal**, September 1973.

This research memorandum presents a concept involving use of highway transportation for local pickup and delivery of freight integrated with rail transportation for the heavy line-haul movements.

RM 5 Davies, Shane, Mark Alpert, Harry Wolfe, and Rebecca Gonzalez, **Passenger Travel Patterns and Mode Selection**, October 1973.

This research memorandum assesses on a limited scale the present patterns of modal travel choice available to passengers in Texas as a preliminary step for structuring a balanced transportation network.

RM 6 Davies, Shane and Mark Alpert, **Segmenting a Transportation Market by Determinant Attributes of Modal Choice**, October 1973.

This research memorandum discusses the background rationale for designing transportation systems to suit user's needs. It also describes the methodology being used to assess these needs in the survey area, and relate them to characteristics and attitudes of key public groups.

RM 7 Zlatkovich, Charles P., **The Interstate Rail System: A Proposal**, December 1973.

This memo describes the possible development of a nationwide network of modernized rail lines somewhat similar to the Interstate Highway System.

RM 8 Shanahan, Bruce, Ronald Stearman, and Anthony Healey, **Literature Survey on Passenger and Seat Modeling for the Evaluation of Ride Quality**, November 1973.

A brief discussion of the various inputs that affect ride quality and the need for ride quality criteria is given.

RM 9 Briggs, Ronald and James Fitzsimmons, **The Definition of Essential Services and the Identification of Key Problem Areas**, January 1974.

This research memo provides a conceptual basis for defining accessibility problems of the rural population with respect to goods and services and delimits subsets from the total which might be termed essential. Differences in usage and supply system characteristics between functional and dysfunctional population are presented as accounting for present problems in the availability of certain types of goods and services.

RM 10 Adair, J. Bryan, **A Procedure for Calculating Great Circle Distances Between Geographic Locations**, March 1974.

This memo describes a computer program and associated procedures presenting a relatively simple means for figuring great circle distances between points for which geographic coordinates are known.

RM 11 Hunter, Graham, Richard Dodge and C. Michael Walton, **MAPRINT: A Computer Program for Analyzing Changing Locations of Non-Residential Activities**, March 1974.

This memorandum describes an analytical tool developed as part of the larger research effort entitled, "The Influence on the Rural Environment of Interurban Transportation Systems" to reflect changing spatial relationships between all non-residential activity and the transportation systems upon which they depend.

RM 12 Matthews, Ronald T., **911 Emergency Telephone Number System—A Proposal for the Capital Area Planning Council**, June 1974.

This is a case study approach to ascertain some of the additional problems involved in implementing the 911 emergency services telephone number system for a rural area as opposed to an urban area.

RM 13 Means, Robert C. and Barry Chasnoff, **State Regulation of Air Transportation in Texas**, April 1974.

The subject of this research memorandum is concerned with aeronautics regulation by a state commission as a third alternative to regulation by a Civil Aeronautics Board and freedom from regulatory controls. This is a preliminary study of this third alternative as it developed in Texas.

RM 14 Zlatkovich, Charles P., S. Michael Dildine, Eugene Robinson, James S. Wilson and J. Bryan Adair, **Transportation Atlas of the Southwest**, June 1974.

This publication provides information on the existing transportation system of the Southwest through the use of maps, charts and tables. The atlas was prepared as part of an inventory and evaluation of transportation facilities, services and practices in the Southwest to be used in developing recommendations for the improvement of freight transportation.

RM 15 Chipman, W.D., **Local Governmental Decisions and Land-Use Change: An Introductory Bibliography**, May 1974.

This bibliography is an attempt to begin the research leading to a viable theory of the interaction between governmental decision making and locational choice in order to better understand the process of land use change.

RM 16 Dildine, Michael, **An Analysis of the Truck Inventory and Use Survey Data for the West South Central States**, July 1974.

A comparison of data drawn from the 1972 Census of Transportation Report for Texas, Louisiana, Oklahoma and Arkansas as to truck ownership and use.

RM 17 Dunlay, William J., and Lyndon Henry, **Towards Estimating the Impact of the Dallas-Fort Worth Regional Airport on Ground Transportation Patterns**, September 1974.

This project is a policy oriented study of the impact of the Dallas-Fort Worth Regional Airport on ground transportation in the Dallas-Fort Worth Area. The focus of the study is to isolate changes in ground transportation patterns that can be attributed to the new regional airport. This research is directed toward producing results and developing a methodology that can be applied to evaluating the impact of other major new regional airports.

RM 18 Shanahan, Bruce, Ronald Stearman, and Anthony Healey, **The Attainment of Riding Comfort for a Tracked Air-Cushion Vehicle Through the Use of an Active Aerodynamic Suspension**, September 1974.

This memo studies the feasibility of controlling high speed ground transportation systems through the use of active lifting surfaces. Various control laws are assumed and vehicle and passenger response studied. An optimal solution to the classic regulator problem was found.

RELATED JOURNAL ARTICLES AND PAPERS

1. Burnett, P., "Disaggregate Behavioral Models of Travel Decisions Other Than Mode Choice: A Review and Contribution to Spatial Choice Theory," in P. Stopher and A. Meyburg, (eds.) **Issues on Behavioral Demand Modeling and the Valuation of Time**, Washington, D.C., Transportation Research Board, forthcoming. Also in P. Stopher and A. Meyburg, (eds. **Issues in Behavioral Demand Modeling and the Valuation of Time, Final Report 70**, U.S. Department of Transportation, Federal Highway Administration, November 1973, Vol 2, pp. 189-205.

   This paper attempts to extend work on disaggregate behavioral modeling of traveling decisions by a collation and review of literature of intra-urban travel decisions other than mode choice, with applications in trip generation, distribution and route assignment. This paper also attempts to focus attention on salient features of spatial choice models and outlines research problems and strategy.

2. Burnett, Pat, "A Bernoulli Model of Destination Choice," accepted for publication at the Highway Research Board Meeting, January 21-24, 1974, Washington, D.C.

   This paper explores an alternative approach to the complexity of destination and the difficulty of developing a single model of a heterogeneous population group. A simple Bernoulli model is developed to describe this process.

3. Hudson, W.R., and C. Michael Walton, "Transportation to Fulfill Human Needs in the Rural/Urban Environment," presented to the 1974 Automotive Engineering Congress and Exposition, Society of Automotive Engineers, February 27, 1974.

   This paper presents background and discusses the initial funding on a multidisciplinary program sponsored by the U.S. Department of Transportation, University Research Program.

The program has two major thrusts: (1) human factors and needs must be considered in planning, developing, and constructing transportation systems; and (2) transportation can help to preserve, restore, and reinforce any symbiotic relationship and balance that may exist between rural and urban life.

4. Walton, C. Michael, and W.R. Hudson, "Transportation Education: A Multidisciplinary Approach," presented to Ohio State University, 1974.

   This paper describes the multidisciplinary transportation programs at the University of Texas with particular attention to the involvement of the Department of Civil Engineering.

5. Bolding, R., T. Healey, and R. Stearman, "Measurement of Roadway Roughness and Motion Spectra for the Automobile Highway System," May 1974.

   This paper was designed to support an overall program for the evaluation and establishment of ride quality criteria in transportation systems. The investigation covers measurements, recordings, and analysis of automobile vibrations and highway or roadway roughness using various areas in Texas.

6. Enders, Wayne T., Patricia M. Poston, and Ronald Briggs, "Access to Essential Services in Rural/Urban Environment: A Selected Interdisciplinary Bibliography," Council for Planning Librarians, Exchange Bibliography, June 1974.

   The main purpose of the literature search was to create a basis from which sound recommendations could be offered for improving the accessibility of essential services to residents of rural areas. The search focused on improving access to the more immediate human needs related to physical, social, and psychological health.

7. Burnett, P., William D. Chipman and Harry P. Wolfe, "Political Decision Processes, Transportation Investment and Changes in Urban Land Use: A Selective Bibliography with particular reference to Airports and Highways," Council of Planning Librarians, Exchange Bibliography, August 1974.

   This bibliography assists with revision and extension of intra-urban location theory explaining how groups and individuals affect change intra-urban land use in the vicinity of new transportation facilities. Special attention is focused on new airports on rural/urban fringes.

8. Alpert, Mark I., and C. Shane Davies, "Segmentation of a Transportation Market by Determinant Attitudes," presented to the American Psychological Association Convention, New Orleans, Louisiana, September 2, 1974.

   The objectives of this research were to develop a method for identifying the transportation features or attributes that determine modal choices for specified trip purposes; to estimate the percentage of people now using private cars who would be quite likely to switch to a public transportation system if it were improved to suit their needs; to evaluate the attributes of existing low-density modes and high-density transportation modes; to indicate appropriate promotional messages to appeal to these potential riders; and to survey both the general adult community and a designated "leadersgroup for their attitudes towards public transportation.

9. Alpert, Mark I. and C. Shane Davies, "A Decision Sciences Approach to the Marketing of Public Transportation," presented at the meeting of the American Institute for Decision Sciences and published in the **Journal of the American Institute for Decision Sciences**, Fall 1974.

   This paper discusses a stratified random sample of adults surveyed concerning numerous attitudes and characteristics useful in designing and marketing public transportation.

10. Healey, A.J., R.O. Stearman and C.C. Smith, "Automobile Riding Quality with Real Highway Roughness," Invited paper, American Institute of Aeronautics and Astronautics Life Sciences and

Systems Specialist Conference, Dallas-Fort Worth, Texas, November 13-15, 1974, to be published in proceedings.

This paper describes vehicle modelling and random acceleration response prediction work of a broad transportation research topic. The research topic deals with the evaluation of riding quality through correlation between subjective feeling responses of a rating panel with objective measures of the vehicle accelerations.

11. Davies, Shane, and Mark I. Alpert, "Modal Choice Models: Introduction and Selected Bibliography," Council for Planning Librarians, Exchange Bibliography, November 1974.

    This research is related to an understanding of how people choose their mode of transportation in cities. Modal split models are utilized because they are characterized by pre-distribution models.

12. Burnett, Pat, "Decision Processes and Innovations: A Transportation Example," **Economic Geography**, forthcoming.

    This paper attempts to develop a methodology for addressing further work in spatial and temporal properties of innovation diffusion, with particular attention to the diffusion of new kinds of links for transportation networks (e.g., highways).

13. Burnett, Pat, Wayne Enders, David Chang, John Betak, and Jose Montemayor, "Transportation-Related Constructs of Urban Activity Spaces," Association of American Geographers, for Milwaukee Meetings 1975, and publication in AAG Proceedings.

    This paper discusses the nature of the space which people in small urban areas use for recurrent activities. An alternative cognitive definition is proposed. Recent modifications of Kelly's Personal Construct Theory and elicitation procedures are used to demonstrate the richness of the cognitive definition of place. It is suggested how elicited transportation-related constructs of places can be utilized to develop improved models of behavior within urban activity spaces.

14. Burnett, Pat, "Mathematical Models of Movement Within Urban Spatial Structures," Invited paper for presented at the **Commission on Quantitative Methods Meeting, International Geographical Union**, Palmerston North, New Zealand, December 4-7, 1974.

    To date, formal mathematical models have not been specified and tested which formulate **first** how different individuals behave in adaptive ways over time in destination and route selection, and **second** how predictions about aggregate movement can be derived from adaptive postulates about different persons. This paper therefore specifies and tests two first order (place loyal, last place loyal) Markov models for heterogeneous individuals and population groups.

15. Burnett, Pat, "Toward Dynamic Models of Travel Behavior and Point Patterns of Traveller Origins," **Economic Geography**, forthcoming.

    This paper describes mathematically how the distribution of travellers around a single destination point changes over time. It then goes on to show how this could be related to a linear learning process, whereby travellers come to learn the location and other characteristics of the destination, and switch to using it or not using it on a regular basis.

GRADUATE THESES AND DISSERTATIONS

1. McGarragh, Thomas G., **A Pavement Design and Management System for Forest Service Roads**—A Conceptual Study, July 1974. (MS)

   This thesis describes Phase I of a projected three-phase study being conducted for the

Forest Service. The purpose of the project is to develop and implement a pavement design and managment system for low-volume roads, in particular, Forest Service roads.

2. Zaniewski, John P., **Airport Capacity Analysis—A Systems Approach**, July 1974. (MS)

This thesis describes existing quantitative models for analysis of the capacity of various components of the airport system. Procedures for utilizing these models are also discussed. Recommendations are made concerning possible modifications of existing models, and priorities for these modifications are assigned according to the necessity for improvement.

3. Matthews, Ronald T., **911 Emergency Telephone Number System—A Proposal for the Capital Area Planning Council**, June 1974. (MS)

The purpose of this thesis is to provide CAPCO planners and governmental officials with a better understanding of 911 systems, indicating a framework for detailed future studies and offering a proposal for a system that would effectively serve CAPCO's 450,000 residents. The report contains a 911 system that is potentially most beneficial for a predominantly urban environment.

4. Shanahan, Bruce Gene, **The Attainment of Riding Comfort for a Tracked Air-Cushion Vehicle Through the Use of an Active Aerodynamic Suspension**, September, 1974. (MS)

The feasibility of controlling high speed ground transportation systems through the use of active lifting surfaces was studied. Aerodynamically three dimensional canards are employed to control the pitch and plunge steady-state response of the vehicle and passenger to harmonic guideway excitations. Various control laws are assumed and vehicle and passenger responses studied.

5. Skorpa, Lidvard, **A Modelling Technique of Land Values in a Rural Community: A Case Study**, August 1974. (MS)

This thesis concentrates on the impact of land values. It discusses why land values can be used as an indicator of community impact and evaluates a technique for modelling land values in a rural community. The technique is used in a case study of Sealy, Texas.

6. Hunter, Graham C., **Rural Communities and Inter-Urban Transportation Systems: A Study of the Stages of Interaction**, August 1974. (MA)

This thesis presents a preliminary model for understanding the impact of the development of an element in an inter-urban transportation system on the social and political structure of a rural community and a case study of one such community.

7. Wilson, James S., **A Consideration of the Impact of Motor Common Carrier Service on the Development of Rural Central Texas**, December 1974. (MBA)

The objective of this study is to consider the impact of a particular mode of freight transportation on a small, predominantly rural area as a measured factor in the area's economic development.

WORKING PAPERS AND REPORTS

1. Doughty, Robin, **Bird Hazards to Aircraft: Competition for Space**, November 1973.

This paper describes the characteristics of bird collisions with aircraft. Attitudes toward birds have changed from affection to hostility since damage from birds can be costly to equipment and endanger human and animal life. Current attempts to minimize these dangers and the outlook for air space are also discussed in the report.

RESEARCH DEVELOPMENT AND PROPOSALS PENDING

The Council for Advanced Transportation Studies regularly monitors information sources to determine potential state or national sponsors for transportation research.

The Council has worked during the past year to identify sponsors for transportation research interests of the University community. During the year we have catalogued over fifty responses to potential transportation research interests of faculty and circulated approximately twenty-five requests for proposals. Of these requests the following research proposals were submitted through the Council to the sponsoring agency.

Energy/transportation/environment policy questions with emphasis on the rural/urban environment—Department of Transportation

Analysis of innovative forms of taxi/jitney service for improvement of the transportation system—Transportation Systems Center

Transportation problems of a depressed, primarily agricultural, economic region—Council for South Texas Economic Progress

Improving the management of an on-going interdisciplinary research program—National Science Foundation

A pavement design and managment system for forest service roads—Forest Service

Environmental and energy impact assessment of railroad electrification—Department of Transportation

Transportation system design for offshore supertanker terminals—Department of Transportation

Ride quality studies on ground-based transportation systems—Department of Transportation

A systems analysis procedure for estimating the capacity of an airport—Department of Transportation

Urban mode shifts—Federal Energy Administration

A proposal for a carpooling impacts study—Federal Energy Administration

Statement of Capabilities for Policy Oriented Transportation Energy Conservation Research—Federal Energy Administration—Procurement Division

Statement of Capabilities—Department of Transportation—Transportation Systems Center

In response to information disseminated by the Council, the following proposals were submitted in 1974 by other Departments of the University of Texas at Austin.

Theoretical and Experimental Modeling of Airport Approach and Landing Problems—Electrical Engineering Department—Department of Transportation

Radial Freeways and the Growth of Office Space in Central Cities—Bureau of Business Research—Federal Highway Administration

The Relationship of Transportation Facilities to the Provision of Social and Economic Services in Rural Areas—School of Architecture—Community and Regional Planning—Department of Transportation

The following research topics are proposals submitted and not funded but will potentially be resubmitted to other sources in FY 1975.

Use of waste materials in the construction of transportation facilities,

Optimum use of natural resources in design and construction of transportation systems,

A transportation system for a major city/university/capitol metroplex,

Educational aspects of use and effectiveness of public transit systems,

Interior design concepts related to transportation vehicles and terminals.

MANAGEMENT OF RESEARCH PROGRAM

Sponsors often express concern that appropriate management be provided for multidisciplinary activities. We agree that there is little chance for success of a program if management is ineffective. However, if the program is structured too tightly, the persons from each discipline may lose their identity and their tie to expertise in their own area.

A workable structure has been developed at The University of Texas at Austin in the Council for Advanced Transportation Studies. The Council, headed by Dr. L.C. Reese, reports directly to the Executive Vice-President of The University. The Council is governed by an Executive Committee of Deans as follows:

Dr. Lymon C. Reese, Chairman,

Dean Charles M. Burnett, Architecture,

CATS Executive Committee in a regular meeting to review Research and Academic Programs.

Dean Wayne Danielson, Communications,

Dean Paul Olum, Natural Sciences,

Dean Earnest F. Gloyna, Engineering,

Dean William Cannon, Lyndon B. Johnson School of Public Affairs,

Dean Ernest E. Smith, Law,

Dean George Kozmetsky, Business Administration,

Dean J.W. McKie, Social and Behavioral Sciences,

Acting Dean Elspeth D. Rostow, General and Comparative Studies,

Dean Stanley Werbow, Humanities,

Dr. W.R. Hudson, Director, Division of Research in Transportation

Research management is handled through the Division of Research of the Council. Thus, accomplishments of a faculty member in any discipline are quickly recognized by his/her Dean as a member of the Executive Committee and this information, along with the individual's teaching and departmental research activities, can be used to justify directly promotions, raises, and other rewards. Therefore, CATS not only provides coordinated control for the research program, but also a close tie for each researcher to his/her own Department and Dean.

A Budget Advisory Committee has been appointed by the President of The University to set overall policy for the Division of Research, to advise the Director of Research and the research group on their activities as needed and to assist the CATS Executive Committee coordinating thses activities with all phases of The University, as required by the multidisciplinary nature of the work. The committee members are:

Dr. Stanley Arbingast, Bureau of Business Research,

Mr. George R. Blitch, Office of Research Management,

Dr. C. Shane Davies, Geography,

Dr. W.R. Hudson, Chairman, and

Mr. Hudson Matlock, Civil Engineering.

Dr. L.C. Reese, ex officio

Mr. R. Dodge, ex officio

COOPERATIVE INTERACTION AND IMPLEMENTATION WITH GOVERNMENT, INDUSTRY AND EDUCATIONAL INSTITUTIONS

The Council for Advanced Transportation Studies has established a broad base of cooperation with a growing number of governmental offices, industries and other educational institutions. Two examples of the cooperative activities are: 1) Dr. C. Michael Walton, one of the DOT project principal investigators, is the CATS representative on the Governor's State Transportation Coordination Council; and 2) the joint Transportation Coordinating Committee with Texas A&M University. This latter committee, jointly established by the presidents of the two universities to improve coordination on transportation activities between the universities, has met three times during the year. The committee sponsored a one day workshop on Transportation-Energy on December 17, 1973 at Texas A&M University that was attended by over 20 faculty members of the two universities. A statewide conference on Texas' transportation/energy problems was held in October 1974.

A representative list of governmental agencies, industries and educational institutions that are cooperating in our research activities is given below along with implementation activities and interaction in the form of conferences, briefings, speakers and visitors to the Council for Advanced Transportation Studies.

STATE OF TEXAS COOPERATING AGENCIES

Governor's Office
- Planning and Coordination
- Comprehensive Health Planning
- Rural Development Commission
- Assistant for Educational Affairs
- Information Services
- Health and Human Resources Council

Aeronautics Commission
Highway Department
Industrial Commission
Railroad Commission
Community Affairs

OTHER STATE COOP AGENCIES
- Louisiana Department of Public Works
- Louisiana Highway Department
- Oklahoma Corporation Commission
- Oklahoma Department of Highways

COOPERATING REGIONAL ACTIVITIES
- Capital Area Planning Council
- Dallas-Fort Worth Regional Airport Board
- North Central Texas Council of Governments
- North Central Texas Commission
- The Council for South Texas Economic Progress

Dr. John Betak, Assistant Director with Mr. Jose Martinez, Transportation Planner, Capital Area Planning Council.

COOPERATING CITIES - CHAMBERS OF COMMERCE

Dallas Chamber of Commerce
Fort Worth Chamber of Commerce
Sealy - City and Businesses
Austin Chamber of Commerce
Austin City Planning
Austin Urban Transportation
Austin Committee on Transportation

COOPERATING INDUSTRIES

LTV, Ground Transportation Division
Missouri Pacific
BRH Mobility Services Company
Long-Oliver-O'Dwyer Electric, Inc.
McKensey and Company
Engineering Foundation, Industrial Associates Program
AMF Inc.
Airline Pilots Association

COOPERATING EDUCATIONAL INSTITUTIONS

Texas A&M University
Huston-Tillotson College
University of Texas at Arlington
University of Texas at San Antonio Medical School
Louisiana State University

IMPLEMENTATION ACTIVITIES

One of the desired goals of the Council's research activities is the implementation and communication of ongoing research with government, industry and other universities. Outlined below are some of the areas and levels of activity that research teams have engaged in during the past year.

Topic I: Access to Essential Services

(1) **Governor's Office.** As part of the identification of the existing service supply system, an examination of school buses available in the study region was initiated. At the same time, an extensive study by the State of Texas Governor's Office of Educational Research and Planning was being undertaken on the state's role in financing education. One aspect of this study was state aid for student transportation. Recognizing a commonality of interest, a joint program culminating in an interagency contract for this area was initiated by the U.T. team and the Governor's office to examine the extent to which students are transported, the cost of bus operation, and the relationship of these factors to the characteristics of the school district. Paramount in the thinking of both the U.T. research team and the Governor's Office was the possibility of using school buses for purposes other than student transportation, particularly for providing transportation to essential services other than education.

Oliver Wilson, Transportation Planner, City Planning Department, Austin, Texas.

(2) **Capital Area Planning Council.** Drs. Ronald Briggs, James Fitzsimmons, and Carol Deets, Principal Investigators for the Topic "Access to Essential Services", are active members of the CAPCO Health Advisory Committee that is currently in the process of developing the regional health plan. Illustrative of this involvement are the following activities:

(a) The researchers have been identifying the structure of the system together with the parameters, the values of which have been supplied by the CAPCO residents through their Health Advisory Committee representatives. This preliminary system structuring insures that alternative supply systems may be comparable for evaluation and that all relevant issues are considered (e.g., service area, manpower, facilities financial souces, transportation, etc.).

(b) with full involvement of the Health Advisory Committee, the team has been obtaining ideas as to types of systems which might be feasible for implementation in the CAPCO region. This Community involvement at the initial level of the system development and specification should insure that workable systems are being considered for further evaluation and not just some academic utopia. Such systems are also more likely to be implemented because of their acceptance by the local community through their continued involvement in their development.

(3) (a) Mr. Ronald Matthews completed an M.B.A. thesis on a 911 Emergency telephone service for the CAPCO Region.

(b) Mr. Wayne Enders, a PhD candidate in Geography is currently investigating the relationship between perceived needs and travel in the CAPCO region.

Topic II; Environmental Impact of Interurban Transportation Systems on Rural Communities

Contact has been maintained with local and state governments, in particular with the Texas Highway Department concerning upcoming public hearings. Coordination with the Texas Department of Community Affairs, has been initiated.

Topic III-A: Improvement of Intermodal Freight Transportation in the Southwest

A major midwestern railroad is currently considering a plan to implement a rail-highway intermodal service similar to the system proposed in the Research Memorandum entitled, "An Intermodal Transportation System for the Southwest: A Preliminary Proposal".

Topic III-B: Monitoring the Effects of the Dallas-Fort Worth Regional Airport

Some 50 major decisionmakers in government and industry in the Dallas-Fort Worth Area are being interviewed. An exchange agreement has been arranged with them to provide them copies of all project reports in return for information on their decision processes. This agreement seems to be providing useful information to these bodies, since the Dallas Chamber of Commerce wishes to publish and distribute copies of the CATS report entitled, "A Preliminary Analysis of the Effects of the Dallas-Fort Worth Regional Airport on Surface Transportation and Land Use", by Mr. Harry Wolfe, at their expense.

Preliminary analysis of the flight and passenger data suggests that feedback to agencies such as the FAA and CAB will result in improved data collection techniques.

Topic IV: Ride Quality Evaluation of Multimodal Systems

A very good interaction has continued between our project and both the Center for Highway Research and the Texas Highway Department.

Other specific interaction has occurred with the National Aeronautics and Space Administration at the Langley Research Center who have loaned us a Three-axis accelerometer and are interested in our vehicle acceleration results.

Informal discussions with L.T.V. (Ground Transportation Division) have helped them in their awareness of ride quality criteria and human response measurement techniques.

Topic V: Human Response in the Evaluation of Modal Choice Decisions

The close cooperation between this study and various state and local agencies, developed early in the program, has been maintained. This has led to the utilization of our research findings by such groups as: Amtrak Agents-Southwest, the Mayor, City, City Counselors, City Planners of Austin, Texas, and the Governor's Office, State of Texas. Associated with this topic, also, has been the development of an interagency contract with the Austin State School to study the travel requirements of the mentally retarded.

Other Conferences and Meetings In addition to the meetings described above, various team members participated in several other professional conferences and meetings which were transportation related, or of some closely allied subject area. These activities are summarized below in an alphabetical listing of members involved.

Dr. Mark Alpert presented a paper on transportation research efforts at a meeting of the American Psychological Association in New Orleans, Louisiana.

Dr. John Betak attended the Environmental Design and Research Association meetings in Milwaukee. He presented two papers and met with researchers from other institutions.

Dr. Ronald Briggs attended the Association of American Geographers Conference in Seattle. He attended transportation related sessions and met with researchers from other institutions.

Dr. Pat Burnett attended the Association of American Geographers Conference in Seattle. She attended transportation related sessions, met with researchers from other institutions, and visited with Dr. J. Schneider, of the University of Washington's interactive computer facility, in regard to possible interactions between his group and Topic IIIB. Dr. Burnett also presented an invited paper at the Quantitative Commission meetings of the International Geographical Union in Palmerston North, New Zealand.

Dr. C. Shane Davies attended the conference on Developing Mass Transit Systems—Legal Aspects and Practical Considerations, in New York City. He attended a variety of sessions and met with researchers from other institutions. Dr. Davies presented a paper at the Environmental Design and Research Association meetings in Milwaukee.

Dr. William Dunlay attended the Dual Mode Conference in Washington and also was an observer at the UMTA program review session. Dr. Dunlay attended several sessions and met with a variety of other researchers. He also participated in the annual Federal Aviation Administration Review Conference in Washington, D.C. as well as attending meetings with representatives from the Dallas-Ft. Worth Airport and members of the North Central Texas Council of Governments.

Drs. Anthony Healey and Ronald Stearman, and Mr. Ed Nathman gave an invited paper at the Joint Automatic Control Conference in Austin. They also met with many researchers from other universities and held special sessions on ride quality problems. They also exhibited the facilities used for ride quality evaluation at the University.

Dr. W. Ronald Hudson visited the Netherlands to meet with the Dutch Government and Grontmij Engineers. He held several meetings and arranged for the development of a cooperative information exchange program. Dr. Hudson also visited with the Puebla Department of Public Roads, Puebla, Mexico, and the American University in Puebla, Mexico. Cooperative information exchange programs are being developed with them. Dr. Hudson also delivered a set of invited talks while there. Dr. Hudson attended the Conference on Management of Large-Scale Interdisciplinary Research programs in Los Angeles. He participated in several sessions. Dr. Hudson also visited South Africa to give a paper at an international conference and to hold several meetings on low-cost roads. He also visited Brazilia, Brazil and discussed cooperative research with the Geipot Research group and the University of Brazilia.

Dr. C. Michael Walton attended the Dual Mode conference in Washington, D.C. and also was an observer at the UMTA program review session. Dr. Walton attended several sessions and met with a variety of other university researchers. He also attended the American Society Civil Engineers conference in Montreal. Dr. Walton also presented a paper to the Texas Section of the American Society of Civil Engineers entitled, "The Effect of Intercity Transportation Systems on Small Urban Areas".

Mr. Charles Zlatkovich chaired a panel on The Census of Transportation at a conference on Economic Census Data Users sponsored by the Bureau of the Census and the Dallas Chamber of Commerce. Mr. Zlatkovich also spoke to the Houston, Texas Chapter of the American Society of Traffic and Transportation and the Ft. Worth, Texas Chapter of Delta Nu Alpha, transportation fraternity, on the subject of Intermodal Freight Transportation in the Southwest.

GUEST LECTURERS FOR TRANSPORTATION SEMINAR SERIES AND VISITORS TO THE COUNCIL

To provide a transportation forum for the students, faculty and the community, the Council sponsors a transportation seminar each semester which invites speakers from many facets of transportation. In addition to faculty and student presentations the seminar hosts national and international speakers from government, industry and other universities.

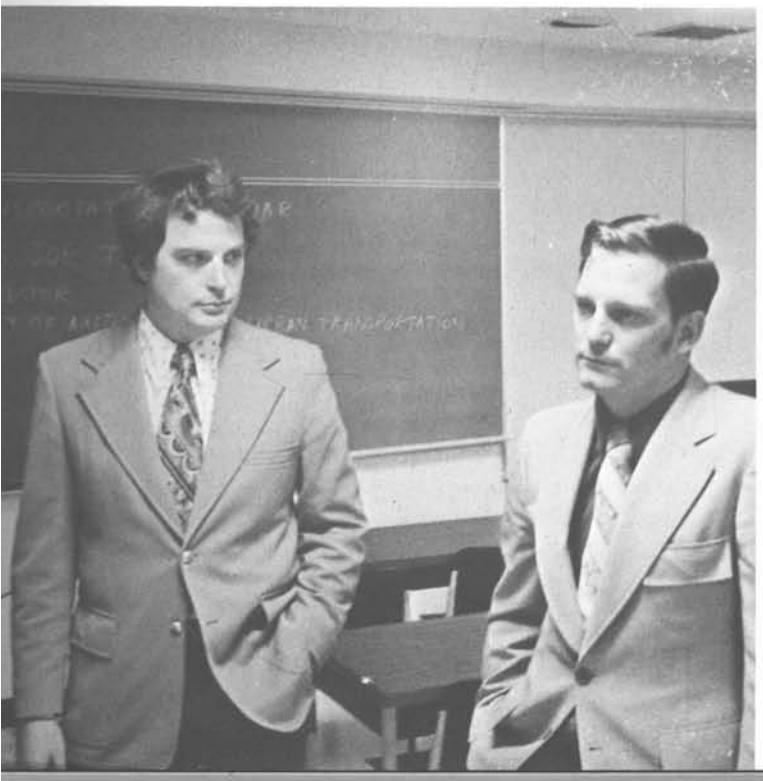
The Council's growing reputation in multidisciplinary transportation research has generated many visitors to the campus during the past year who have sought a broad range of interaction from transportation problems to an interest in management of multidisciplinary research activities.

The following is a list of seminar speakers and program visitors.

DATE	SPEAKER	TOPIC
January 28, 1974	Mr. K. Wester, Director Dutch Road Study Center Mr. P. Elsenaar, Chief, Instrumentation Lab Mr. J. Brouwers, Chief, Pavement Research	"First Hand Report on the Energy Crisis in Holland"
February 4, 1974	Mr. Robert P. Neuschel, McKinsey and Company	"Air Transportation Industry's Profit Economics"
February 11, 1974	Mr. Roger Walker, Computer Sciences UT Arlington	"The Use of Power Spectral Analysis in Predicting Pavement Serviceability"
March 25, 1974	Mr. Luthur DeBerry, State Highway Engineer Mr. Mark Goode, Assistant State Highway Engineer	"The Changing Role of the Highway Department"
April 8, 1974	Mr. Robert P. Neuschel, McKinsey and Company	"New Hope for Urban Mass Transit"
April 8, 1974	Dr. Edward K. Morlok, Transportation Science Chair, University of Pennsylvania	"A Multi-Objective Approach to Urban Highway Planning Models"
September 16, 1974	Mr. John Staha, Transportation Co-ordinator, Division of Planning and Co-ordination Office of the Governor	"Transportation Policy Formulation for the State of Texas"
September 30, 1974	Mr. Walter Wendlandt, Director of Transportation, Texas State Railroad Commission	"The Role of the Texas Railroad Commission in the State Transportation Policy and Programs"
October 7, 1974	Mr. Marcus L. Yancey, Jr., Assistant State Highway Engineer, Texas Highway Department	"Future for Transportation"

Students discussing transportation policy questions with Texas State Representative James E. Nugent.

October 21, 1974	Mr. John J. Conrado, Division Engineer, Federal Highway Administration	"Federal Highway Administration's Role in Transportation"
November 4, 1975	Mr. Joe Ternus, Director Urban Transportation, Austin, Texas	"The Role of Cities in State Transportation Policy Formulation"
November 11, 1974	Mr. Charles Murphy, Executive Director, Texas Aeronautics Commission	"The Impact of the Texas Aeronautics Commission on Texas Transportation Policies"
November 18, 1974	Mr. Roy Bayless, Director of Aviation Austin Municipal Airport	"The Aiport Manager's View"
November 25, 1974	Honorable James E. Nugent, Chairman, House Transportation Committee, Texas State House of Representatives	"Transportation in Texas Where Are We Going?"
December 2, 1974	Mr. Lyndon Henry, Executive Director Texas Association for Public Transportation	"Developing a State Action Program for Mass Transportation"



PROGRAM VISITORS

In addition to speakers, we have had a number of visitors to the Council from Universities, industry and government both from this country and foreign nations.

Kor Wester, Arnhem Holland

Peter Elsenaar, Delft, Holland, State Road Lab

Joop Brouwers, Delft, Holland, State Road Lab

Antonio G.N. Novaes, School of Engineering, University of Sao Paulo

Roger S. Walker, University of Texas at Arlington

Aad T. Klomp, Shell Laboratories, Amsterdam, Holland

Peter Van de Loo, Shell Laboratories, Amsterdam, Holland

R.L. Carstens, C.E. Department, Iowa State University

Howard Meeks, Industrial Engineering Department, Iowa State University

K.A. Brewer, C.E. Department, Iowa State University

M.L. Millett, Jr., Aerospace Engineering, Iowa State University

R.O. Richards, Jr., Sociology Department, Iowa State University

P.W. Peterson, Engineering Research Institute, Iowa State University

Gene Goodson, Department of Transportation, Washington, D.C.

Eddie Otte, National Institute of Road Research, Pretoria, South Africa

Kathy O'Leary, Department of Transportation, Washington, D.C.

Richard Hannon, Department of Transportation, Washington, D.C.

Joe P. Meck, Department of Transportation, Washington, D.C.

Mr. Joe Ternus, Director of Urban Transportation, Austin; outlines the Role of Cities in State Transportation Policy with Dr. C. Michael Walton, Civil Engineering.

Jose Martinez, Capital Area Planning Council, Austin, Texas

Robert C McWherter, LTV Aerospace Corp., Dallas, Texas

Robert P. Neuschel, McKinsey and Company, Chicago, Illinois

Ewen Duncan, B.S. Bergman and Partners, Durban, South Africa

N.B. Robinson, Jeffares and Green Consulting Engrs., Pietermartzburg, South Africa

R.V.J. Smith, National Roads Department, Pietermartzburg, South Africa

Malcom F. Mitchell, Dept. of Transportation, Pretoria, South Africa

Roy B. Hindle, National Roads Department, Pietermartzburg, South Africa

James E. Nugent, Texas State House of Representatives

Ray Weil, Department of Transportation, Washington, D.C.

Earnest Weisse, George Washington University

Jim Shaw, University of California

Steve James, TDCA

Joe A. Mickie, Capital Area Planning Council

Kelley Hamby, Governor's Office of Education

Donald Harley, Governor's Office, Planning Coordination

Gene Hansen, Forest Service, Ogden, Utah

Larry Hendrickson, Division of Engineering, Forest Service

Ronald Williamson, Division of Engineering, Forest Service

Adrian Pelzner, Division of Engineering, Forest Service

Lawrence Abernathy, Forest Service

Louis A. Hepfl, Forest Service

Sidney Nerdahl, Forest Service

Edward Stuart III, Forest Service

Ralph Fair, Forest Service

Heyward Taylor, Forest Service

Members of the Dutch Road Studies Institute spend a portion of their visit in the lab with students and faculty.

Virgil L. Anderson, Statistics Department, Purdue University

Leonard Stern, Forest Service

Edward K. Morlok, University of Pennsylvania

Norman Cooper, Office of the Secretary of Transportation, Washington, D.C.

William F. Brown, OST, Department of Transportation, Washington, D.C.

Dr. Rudy Steck, Hanover University, Hanover, Germany

John Staha, Governor's Office, State of Texas

Olle Anderson, Swedish Road and Traffic Research Institute, Stockholm, Sweden

Erling K. Hansen, Norwegian Road Research Laboratory, Norway

Harro E. Van Der Most, Chairman of the committee and Director of the Laboratory of the Dutch Cement Industry

George H. Kellersmann, Chief Engineer Public Works, Amsterdam, Holland

Jan S. Sipkema, Director of Heijmans Inc.

Jan J.M. Van Der Vring, Scientific Officer of Stichting Studie Centrum Wegenbouw

Manfred Hausman, New South Wales Institute of Technology, Australia

Byron Nupp, U.S. Department of Transportation, Washington, D.C.

Sheila Widnall, U.S. Department of Transportation, Washington, D.C.

Ray Weil, U.S. Department of Transportation, Washington D.C.

The University acts as a focal point for interaction between industry, state, and local government on the future of transportation policy and programs.

ACADEMIC PROGRAMS IN TRANSPORTATION

Six schools and colleges of The University of Texas at Austin and a number of other divisions have on-going programs in transportation and in transportation-related fields. Some of these programs have been in existence for many years and have historically cooperated with each other in various research projects. In addition, multidisciplinary graduate programs in transportation have been available in some of the present graduate degree structures for a number of years.

The academic programs currently available provide all of the elements necessary for the rapid synthesis of truly multidisciplinary formal graduate degree programs in transportation. The Academic Division of the Council for Advanced Transportation Studies is charged with the task of working out the details for formalizing these programs.

The present curricula provide a firm foundation for the development of multidisciplinary transportation programs and the present faculty have much experience in the teaching of transportation and transportation-related courses.

To help develop this coordinated program in transportation studies, the Council prepared a brochure entitled "Academic Programs in Transportation." This brochure lists over 90 courses which are directly or indirectly related to transportation, and which are currently offered on the U.T. campus.

The Council has also offered two University-wide transportation seminars. One is an undergraduate course intended to provide the student with an overview of transportation problems and phenomena. The second course is a graduate seminar and covers a wide range of transportation policy issues.

PERSONNEL INVOLVEMENT IN CATS

FACULTY

Faculty involvement in the Council of Advanced Transportation Studies and Division of Research during the past year has been as follows:

W.R. Hudson, Civil Engineering, Director of Division of Research in Transportation, Budget Advisory Committee (Chairman), CATS Executive Committee (ex officio),

Lymon C. Reese, Civil Engineering, CATS Executive Committee (Chairman), Budget Advisory Committee (ex officio),

William Cannon, Dean, Lyndon B. Johnson School of Public Affairs, CATS Executive Committee,

Wayne Danielson, Dean of School of Communications, CATS Executive Committee,

Earnest F. Gloyna, Dean of College of Engineering, CATS Executive Committee,

Ernest E. Smith, Dean, School of Law, CATS Executive Committee,

George Kozmetsky, Dean of College of Business Administration, CATS Executive Committee,

J.W. McKie, Dean of College of Social and Behavioral Sciences, CATS Executive Committee

Elspeth D. Rostow, Acting Dean of General and Comparative Studies, CATS Executive Committee,

Stanley Werbow, Dean of College of Humanities, CATS Executive Committee,

Charles Burnett, Dean of School of Architecture, CATS Executive Committee,

Paul Olum, Dean of College of Natural Sciences, CATS Executive Committee,

C. Shane Davies, Geography, Corresponding Principal Investigator, Budget Advisory Committee, DOT Operating Committee,

Stanley Arbingast, Bureau of Business Research, Budget Advisory Committee, Corresponding Principal Investigator, DOT Operating Committee,

Hudson Matlock, Chairman, Civil Engineering, Budget Advisory Committee,

Richard Dodge, Architecture, Budget Advisory Committee (ex officio), Corresponding Principal Investigator, DOT Operating Committee,

Ronald Briggs, Geography, Corresponding Principal Investigator, DOT Operating Committee,

Anthony Healey, Mechanical Engineering, Corresponding Principal Investigator, DOT Operating Committee,

Paul Jensen, Mechanical Engineering, Principal Investigator,

James Fitzsimmons, Mangement, Principal Investigator,

Carol Deets, Nursing, Principal Investigator,

Michael Walton, Civil Engineering, Principal Investigator, CATS Executive Secretary, DOT Operating Committee,

William Dunlay, Civil Engineering, Corresponding Principal Investigator, DOT Operating Committee,

Patricia Burnett, Geography, Principal Investigator, DOT Operating Committee,

C. Craig Smith, Mechanical Engineering, Principal Investigator,

Alfred Smith, School of Communications, Director Communications Research Center, Principal Investigator,

Charles Clark, Business, Principal Investigator,

Robert Means, Law, Principal Investigator,

Ronald Stearman, Aerospace Engineering, Principal Investigator,

Larry Hoberock, Mechanical Engineering, Principal Investigator,

Mark Alpert, Marketing, Principal Investigator,

Stan Burnham, Regional Medical Program, Faculty Associate,

Kingsley Haynes, Lyndon B. Johnson School of Public Affairs, Faculty Associate,

Tom Kennedy, Civil Engineering, DOT Operating Committee, Faculty Associate,

Dudley Poston, Sociology, Faculty Associate,

Sandra Rosenbloom, Community and Regional Planning, Faculty Associate,

Elmer Hixon, Electrical Engineering, Principal Investigator,

Franklin McCullough, Civil Engineering, Principal Investigator,

Baxter Womack, Electrical Engineering, Faculty Associate,

James Holmes, Engineering Graphics, Faculty Associate,

George R. Blitch, Office of Research Management,

Charles P. Zlatkovich, Bureau of Business Research, Faculty Associate,

John Shortreed, Civil Engineering, Faculty Associate,

Robert Young, Psychology, Principal Investigator,

Edward L. Frome, General Business, Principal Investigator,

James M. Treece, Law, Principal Investigator,

Robert G. Mather, Architecture, Principal Investigator,

John H. Vanston, Mechanical Engineering, Associate Director, Center for Energy Studies, Faculty Associate,

Tom Hill, Associate Director for Operations, Center for Energy Studies, Faculty Associate,

Hal Cooper, Civil Engineering, Environmental Health Engineering Laboratories, Principal Investigator,

Albert Shapero, Management, Faculty Associate,

Clyde Lee, Civil Engineering, Director, of Center for Highway Research, Faculty Associate,

James E. Hartling, Community and Regional Planning, Faculty Associate,

Kenneth H. Jehn, Meteorology, Faculty Associate,

Charles C. Cleland, Special Education and Educational Psychology, Faculty Associate,

Barbar J. Chance, Sociology, Faculty Associate,

Richard L. Schott, Government, Faculty Associate,

Charles M. Bonjean, Sociology, Faculty Associate,

Sheldon R. Olson, Sociology, Faculty Associate,

D.M. Huffman, Management, Faculty Associate,

Herbert H. Woodson, Electrical Engineering, Director, Center for Energy Studies,

Milton E. Schoeman, Managment, Faculty Associate,

Niles M. Hansen, Economics, Director, Center for Economic Development, Faculty Associate,

John Gallery, Architecture, Associate Dean, Faculty Associate,

Jay Nematollahi, Pharmaceutical Chemistry, Faculty Associate,

Peter R. Antoniewicz, Physics, Faculty Associate,

C.D. Zinn, Mechanical Engineering, Faculty Associate,

Richard Furlong, Civil Engineering, Faculty Associate,

William G. Lesso, Mechanical Engineering, Faculty Associate,

Robin Doughty, Geography, Faculty Associate,

Carl E. Hansen, Special Education, Faculty Associate,

Linda Golden, Marketing Administration, Faculty Associate

Graduate Students prepare for DOT Briefing Session

GRADUATE STUDENTS

A major area of concern of the Council is the development of graduate students who will enter the work force with skills to assist in the solution of transportation problems in their various fields of endeavor. During the past year, fifty graduate students worked for the Council. The following is a list of students who are continuing research and education from FY 73-74 and those who have completed degree programs.

Gary Michael Alletag, B.B.A., Topic V, Law

Nancy Jean Bauer (miniproposal), B.A., Community and Regional Planning

Nan Standish Blake (miniproposal), M.F.A., Photography

Kevin Thomas Bowman, B.A., Topic I, Geography

Mallory J. Campbell, B.S., Topic V, Marketing

Chang-Yi David Chang, M.A., Topic IIIB, Geography

Bruce Robert Coulombe, B.S., Topic IIIA, Law

Gordon Derr, B.S.C.E., Topic II, Civil Engineering

S. Michael Dildine, B.S., Topic IIIA, Business Administration

William D. Driscoll, M.S., Topic I, Mechanical Engineering

Wayne T. Enders, M.A., Topic I, Geography

Noel Engemoen, B.S., Topic V, Business

Anthony K. Gregory, B.A., Topic II, Architecture

William K. Groll, B.A., Topic IIIB, Community and Regional Planning

Karen Haynes, A.B., M.S.W., Topic I, Social Work

Lyndon Henry, B.S., Topic IIIB, Community and Regional Planning

Enrique Cano Jiminez, B.S., Forest Service, Civil Engineering

Edward N. Kasparik, B.A., Topic IIIA, Community and Regional Planning

Joanne DeFrank Koegel, M.C.R.P., Topic IIIB, Geography

Japhet S. Law, B.S., Topic I, Mechanical Engineering

William A. Leonard, IV, B.A., Topic I, Geography

David McGehee, B.S., Topic IV, Mechanical Engineering

Jose de Jesus Montemayor, M.A., Topic II, Electrical Engineering

Mazim S. Nathoo, B.S., M.S., Topic IV, Mechanical Engineering

Ricardo Nicolau del Roure, M.S., Civil Engineering

William F. Perrin, B.B.A., Topic I, Business

Patricia Ellen Ragle (miniproposal), B.S., English

Shirley Selz, B.A., Forest Service, Law

John P. Sparks, B.A., Topic IIIB, Community and Regional Planning

Beverly Spikes, B.B.A., Topic V, Marketing

David Stamman, M.A., Topic IV, Psychology

Michael Lee Stewart, M.A., Topic IV, Psychology

Douglas Wiersig, B.S., Chem. Engr., Topic IIIB, Chemical Engineering

Hugh J. Williamson, M.A., Topic IV, Mathematics

Charles P. Zlatkovich, M.B.A., Topic IIIA, Business-Transportation

The following graduate students have completed degree programs while working for the Council for Advanced Transportation Studies. These students are now employed in industry and government.

David Brown, MBA Business Administration, Exxon Corporation, Baytown, Texas.

Barry Chasnoff, J.D., Attorney for the Department of Transportation, Washington, D.C.

William Chipman, MCRP Community Planning, University of Texas Library System.

William D. Driscoll, Ph.D. Mechanical Engineering, Assistant Professor, Department of Mechanical Engineering, University of Texas.

Graham Hunter, MA Architecture, Private Architecture Firm in Connecticut.

Roger Kester, MA Geography, Transportation Planner, Missouri State Highway Department, Jefferson City, Missouri.

Thomas Lee, MBA Management, Capital National Bank, Houston, Texas.

Ronald Matthews, MBA Business Administration, Arthur Anderson Consultants.

Edward Nathman, MSAE Aerospace Engineering, Engineer, Bell Helicopter, Fort Worth, Texas.

Thomas G. McGarragh, MSCE, Civil Engineering, Engineer, Exxon Oil, California.

Frank Schleicher, MBA Business Administration, Fluor Corporation, Los Angeles, California.

Bruce Shanahan, MSME Mechanical Engineering, Engineer, McDonnel Douglas Aircraft, California.

Lidvard Skorpa, MSCE Civil Engineering, Transportation Planner, National Highway Administration, Oslo, Norway.

David Venhuizen, MSCE Civil Engineering, Transportation Consultant, Governor's Office of Educational Research and Planning, Austin, Texas, and Institute for Educational Finance Research, University of Florida.

Terry Watson, MSCE Civil Engineering, Transportation Planner, Texas Highway Department, District Office, Dallas, Texas.

Jim Wilson, MBA Business Administration, Assistant-to-the Vice President for Business Affairs, Shuttle Bus Operation, University of Texas.

Harry Wolfe, MA Geography, Aviation Planner, Illinois Department of Transportation, Springfield, Illinois.

ADMINISTRATIVE STAFF

The major research efforts of the faculty and graduate students of the Council are also supported by part-time and a small number of full-time administrative staff. A significant number of the staff personnel is derived from the undergraduate student body. This employment provides opportunities for financial assistance to education in many disciplines of the university.

Susan P. Barry, Secretary

Jenny Lou (Appleton) Batson, Senior Secretary, Topic II

Franklin C. Bergman, Social Science Research Associate III

Jennifer B. Brewster, Topic III A

Frances DeLaCruz Bricano, Senior Clerk Typist, Topic III A

Kristin M. Brown, Laboratory Research Assistant II

James Robert Buchanan, Topic III A

Kathryn Elizabeth Burger, Topic III A

Joan Carol (Bates) Cantu, Draftsperson I

Patricia Cole, Topic V

Patrick G. Collins, Topic V

Anita Emily Cox, Topic V

Florence Escott, Topic III A

Diane Elizabeth Fischer, Senior Secretary, Topics II and III B

Rebecca Gonzalez, Senior Secretary, Topic V

Paul Warren Green, Topic III A

Nancy Jo (Haenel) Watson, Senior Clerk Typist

Robert Haller, Topic V

William L. Hezlep, Topic III A

John Huddleston, Social Science Research Associate II, Topic II

Kathryn Jost, Topic V

Robert M. Lockwood, Topic III A

Christine L. McCullough, Topic III A

Karen Michaud, Secretary

Sharlene Neibauer, Topic V

Linda Lucille (Skinner) Pethia, Administrative Secretary

Donna Prestwood, Topic V

Dianne Young Priddy, BBA, Topic III A, Business Administration

Patricia Marie (Davis) Rein, Secretary

Daniel P. Rosas, Topic III A

Janette Marie (Points) Scott, Senior Secretary, Topic I

Georgia Seitz, Topic V

Janice Sherwood, Draftsperson

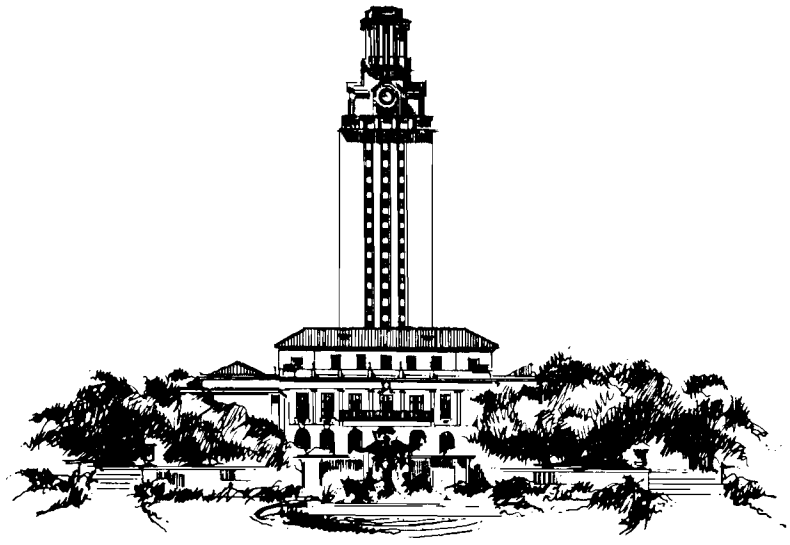
Marilyn Celeste Turnbill, Topic III A

Charles E. Watkins, Ph.D., Research Associate

Patricia Ann (Banks) Williams, Senior Secretary

Gary Joe Wolfe, Research Associate

Administrative staff from various research topics coordinate report preparation and format with Dr. Glover Cunningham, Assistant Director.



Council for Advanced Transportation Studies

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