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**Iowa Department of Transportation**

**FY 1997**

**State Planning, Research, Development  
and Technology Transfer  
Work Program**

**Project SPR-PL-(33)**

**July 1, 1996 - June 30, 1997**

**In Cooperation with the  
U. S. Department of Transportation  
Federal Highway Administration**

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**FY 1997  
State Planning, Research and  
Technology Transfer  
Work Program  
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Iowa  
State Planning, Research, Development and Technology Transfer  
Work Program  
July 1, 1996 - June 30, 1997

Project SPR-PL-(33)

**Program Finances**

**SPR Fund Sources**

Two percent of the Federal-aid Highway funds apportioned to Iowa is earmarked for transportation planning and research purposes. Authority for this is included in Section 307(c) of Title 23, United States Code. These are known as State Planning and Research (SPR) funds. Twenty-five percent of these funds shall be expended for research, development, and technology transfer activities. SPR fund calculations are illustrated below:

<u>Program</u>	<u>FY 1997 Apportionment</u>
Interstate Maintenance	\$ 38,708,804
National Highway System	52,307,635
Surface Transportation	66,452,640
Bridge	38,140,105
Congestion and Air Quality	<u>4,902,542</u>
	\$200,511,726
2% SPR	\$ 4,010,234
NCHRP	\$ <u>176,098</u>
Available SPR	\$ 3,834,136
Research, Development, and Technology Transfer (25%)	\$ 958,534

**Work Program SPR-PL-(33)**  
**Fiscal Year 1997**  
**(July 1, 1996 - June 30, 1997)**  
**Financial Summary Sheet**

**A. Total Estimated Costs (Includes State Match)**

Sections I - X - Planning (SPR) .....	\$ 5,728,000
Metropolitan Area Planning (PL) .....	<u>1,032,554</u>
Sub Total .....	\$ 6,760,554
 Section XI - Research, Development and Technology Transfer (SPR) ..	<u>805,398</u>
 Total .....	\$ 7,565,952

**B. Available Federal Funds**

Estimated FY 1993 - 1996 Balance		
	SPR (Planning, 75%)	\$ 5,429,968
	SPR (R D & TT, 25%)	24,176
 Estimated FY 1997 Funds		
	SPR (Planning, 75%)	2,875,602
	SPR (R D & TT, 25%)	<u>958,534</u>
	Total SPR	9,288,280
 Estimated FY 1993 - 1996 Balance		
	PL	119,453
 Estimated FY 1997 Funds		
	PL	<u>826,043</u>
	Total PL	945,496
 Total SPR & PL Amounts		<u>\$ 10,233,776</u>

### C. Proposed SPR-PL-(33) Project Financing

	<u>Federal Participation Ratio</u>	<u>Federal Funds</u>	<u>State Funds</u>	<u>Other Funds</u>	<u>Total Funds</u>
Pooled SPR	1.00	\$ 491,098			\$ 491,098
SPR	0.80	4,774,400	1,193,600		5,968,000
TRB Research Correlation Service	1.00	74,300			74,300
		-----	-----		-----
Subtotal		\$ 5,339,798	1,193,600		\$ 6,533,398
PL	0.80	826,043		206,511	1,032,554
					=====
Total Funds					7,565,952



**Itemized Cost Estimate  
For  
Project HPR-PL-1(33)**

**I. Administration (\$450,000)**

A. General - 710 .....	\$ 450,000
B. Planning General .....	(Non-participating)

**II. Highway Inventory (\$272,000)**

A. Rural and urban road inventory - 728 .....	\$ 220,000
B. Rail grade crossing inventory - 703 .....	\$ 7,000
C. Base records - 757 .....	\$ 45,000

**III. Highway Traffic (\$1,159,000)**

A. Traffic volume counts (\$1,057,000)	
1. Automatic traffic recorders - 702 .....	\$ 290,000
2. Primary road traffic counts - 720 .....	\$ 410,000
3. Secondary road traffic counts - 709 .....	\$ 230,000
4. Urban area traffic counts - 750 .....	\$ 15,000
5. Municipal traffic counts (under 25,000) - 758 .....	\$ 112,000
B. Vehicle weight surveys - 713 .....	\$ 25,000
C. Vehicle speed surveys - 712 .....	(Maintenance activity)
D. Origin and destination surveys - 726 .....	\$ 2,000
E. Highway traffic forecasting - 739 .....	\$ 75,000

**IV. Cartography - Mapping and graphics - 705 .....** \$ 550,000

**V. Statistics - 701 .....** \$ 350,000

**VI. Transportation Systems Management - 754 .....** \$ 600,000

**VII. Transportation Systems Planning (\$2,584,554)**

A. Highway sufficiency ratings - 727 .....	\$ 35,000
B. Highway needs study - 733 .....	\$ 125,000
C. RISE planning - 762 .....	\$ 110,000

D. Statewide transportation planning (\$915,000)

1. Statewide long-range intermodal transportation planning - 763  
..... \$ 850,000
2. Airport planning - 765 ..... (Non-participating)
3. Public transit planning - 745 ..... \$ 65,000
4. Railroad planning - 766 ..... (Non-participating)
5. River planning - 767 ..... (Non-participating)
6. Scenic byways planning - 736 ..... (Non-participating)
7. Recreational trails planning - 737 ..... (Non-participating)

E. Urban transportation planning (\$1,219,554)

1. Urbanized areas - 707 ..... \$ 172,000  
PL funds (includes local match) ..... \$ 1,032,554
2. Urban areas (less than 50,000) - 708 ..... \$ 15,000

F. Regional transportation planning - 704 ..... \$ 180,000

VIII. Project Planning (\$600,000)

- A. Project planning and environmental - 738 ..... \$ 600,000
- B. Highway planning - 722 ..... (Non-participating)

IX. Transportation Enhancements Planning - 735 ..... \$ 45,000

X. State Transportation Improvement Program (\$150,000)

- A. Statewide transportation improvement program - 753 ..... \$ 150,000
- B. Parks and institutional roads program - 768 ..... (Non-participating)

XI. Research Development and Technology Transfer (\$ 805,398)

- A. Administration - 771 ..... \$ 124,300
- B. National pooled-fund studies - 776 ..... \$ 491,098
- C. General implementation - 774 ..... \$ 40,000
- D. Highway research support - 775 ..... \$ 150,000
- E. Other research - 777 ..... (Non-participating)



## Introduction

This is Iowa's fortieth work program for planning, research, development and technology transfer activities funded with federal-aid monies. It is submitted in compliance with Sections 420.111 and 420.209 of Chapter I, Title 23, Code of Federal Regulations. This plan documents FY 1996 accomplishments as well as activities proposed for FY 1997. The responsibility for the accomplishment of this program and the monitoring of outside activities included lies with the Planning and Programming Division of the Iowa Department of Transportation.

The organization of the Iowa Department of Transportation has a functional structure in which planning, project development, and maintenance are all addressed on an intermodal basis. The Planning and Programming Division is directly involved in the activities of all transportation modes. The organizational structure for addressing research, development and technology transfer is taking a new form. FY 1997 will see the first RD&TT program whose projects have been selected through a broad based interdisciplinary team approach. The Iowa Department of Transportation, the state's universities, local governments, and private transportation interest groups have participated.

In addition to the research, development and technology transfer activities outlined in Section XI, the department participates in an active state- and local-funded research program through the Iowa Highway Research Board. The research funded by that board is reported annually. The report is available on request. The activities of the Iowa Highway Research Board are summarized in Section XI.

If, during the period covered by this program, additional activities or significant changes in anticipated program costs arise, they will be reflected in amendments to the work program.



## **I. Administration**

**Total Estimated Cost: \$ 450,000**

### **A. General**

#### **1. Program administration - 710**

#### **2. Administrative support - 710**

#### **Objective**

General administration of the SPR Work Program is the responsibility of the office directors of the Planning and Programming Division, their administrative support personnel, the Planning Coordination Team, and ten Transportation Center Planners located throughout the state. The objective of this administrative activity is to provide training, guidance and support necessary for the effective management of the program.

#### **Accomplishments 1996**

A substantial portion of the FY 1996 administrative effort has been directed toward completing the implementation of various planning-related aspects of the Intermodal Surface Transportation Efficiency Act of 1991. Restructuring of planning activities and the reallocation of resources within the Department and the Division have been necessary to accomplish the goals of ISTEA. Wherever possible, the activities of the Division that involve interaction with local governments are managed directly by the Transportation Center Planners.

#### **Proposed 1997**

Administrative costs are charged to time-sheet function code 010. The portion of those costs that are estimated to be federal-aid reimbursable are aggregated by the Office of Accounting under function code 710. The estimate is made based on the Division-wide ratio of SPR-related time to total time. For FY 1996 SPR-related time accounted for 55% of all Planning and Programming Division time. Total function code 710 time cost is estimated at \$818,200 for FY 1997. This general administrative time under function code 710 would only be submitted for reimbursement if other eligible costs do not exceed available annual federal funding. The costs are included in the FY 1997 program estimate.

**1996 Program**  
\$495,000

**1996 Estimated Expenditures**  
\$445,000

**1997 Program**  
\$450,000

## **B. Planning General**

### **1. Legislative review - 020**

#### **Objective**

The objective of legislative review is to participate in the preparation of the department's annual legislative package, evaluate the policy and fiscal impact of proposed legislation, provide background information to legislators and to keep the Planning and Programming Division informed of the status of pending legislation.

#### **Accomplishments 1996**

Staff participated in the preparation of proposed legislation for the 1996 session of the General Assembly. Inquiries from the Legislative Fiscal Bureau and from individual legislators were answered.

#### **Proposed 1997**

Staff will participate in the preparation of the 1996 legislative program and will provide background information as requested.

<b>1996 Program</b>	<b>1996 Estimated Expenditures</b>	<b>1997 Program</b>
Non-participating activity	---	---

### **2. Regulatory analysis - 764**

#### **Objective**

The objective of regulatory analysis is to review proposed federal and state administrative law and pending actions to evaluate the impact on transportation programs.

#### **Accomplishments 1996**

Staff monitored Federal Register and Iowa Administrative Code for actions with transportation impact.

#### **Proposed 1997**

Staff will continue to monitor actions and comment as necessary.

<b>1996 Program</b>	<b>1996 Estimated Expenditures</b>	<b>1997 Program</b>
Non-participating activity	---	---

## II. Highway Inventory

Total Estimated Cost: \$ 272,000

### A. Rural and urban road inventory - 728

#### Objective

The objective of road inventory is to maintain a current Base Record Inventory of highway facilities.

#### Accomplishments 1996

The secondary road system was inventoried in ten counties. Municipal street inventory was completed in 33 counties. Road inventory was completed on the entire State Park and Institutional system and the Federal Domain system. Ten thousand directional miles of primary highway were videologged. Disks (about 60 at \$270 each for a total of \$16,200) for the videolog system were charged to function 728.

#### Proposed 1997

A complete road inventory will be conducted on the Primary System. Part of this inventory will be accomplished using the videolog system. Secondary road inventory will be completed in ten counties. Ten thousand directional miles of primary road will be videologged. Disks (about 40 at \$300 each for a total of \$12,000) for the videolog will again be charged to function 728. Plans and specifications will be developed for the replacement of the videolog system for the FY 1998 season.

1996 Program	1996 Actual Expenditures	1997 Program
\$ 228,000	\$ 203,983	\$ 220,000

### B. Rail grade crossing inventory - 703

The objective is to maintain a current inventory of railroad grade crossings.

#### Accomplishments 1996

Railroad grade crossing data were updated as they were received from rail companies.

#### Proposed 1997

Railroad grade crossing data will be updated as data are received.

1996 Program	1996 Actual Expenditures	1997 Program
\$ 7,000	\$ 6,078	\$ 7,000



## **C. Base records - 757**

### **Objective**

The objective of base records is to maintain a dynamically structured information system. As the needs for the base records evolve, the record will be modified to meet those needs without affecting the existing software using the system. The base records serve as the data source for various reports including HPMS, vehicle miles, bridges and summaries of mileages.

### **Accomplishments 1996**

Work on the Data Base Management System included not only the needs of our users but also the changes and requirements caused by ISTEA. The base record has been converted to metric.

### **Proposed 1997**

Work on the Data Base Management System will continue during the year. Updates to meet users' needs will be made as needed along with continuation of software conversion to metric.

**1996 Program**  
\$ 45,800

**1996 Actual Expenditures**  
\$ 42,180

**1997 Program**  
\$ 45,000

### **III. Highway Traffic**

#### **A. Traffic volume counts**

**Total Estimated Cost: \$ 1,057,000**

##### **Objective**

The objective is to measure motor vehicle volumes and associated factors in a variety of ways on all systems.

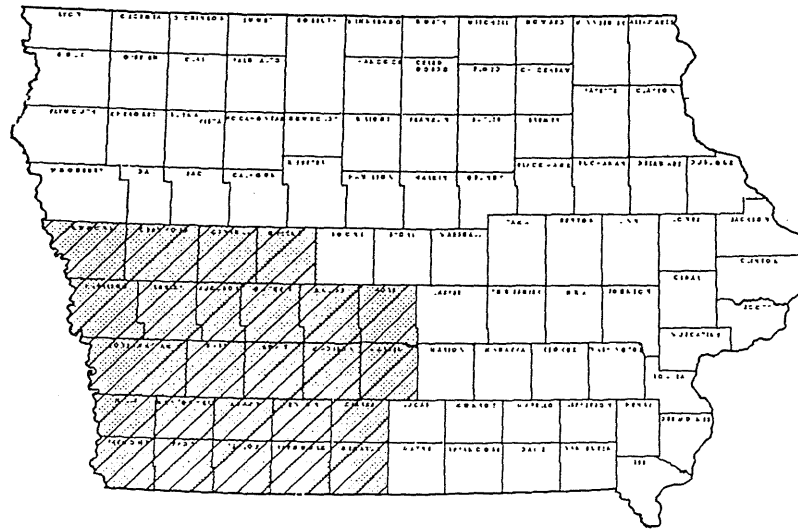
##### **Accomplishments 1996**

Traffic volume, velocity, and classification data were collected using the 123 Automatic Traffic Recorder network. Monthly and annual reports were prepared and distributed; computer tapes were submitted to FHWA. Traffic monitoring and weigh-in-motion equipment were purchased. The summer count program included over 11,500 counts on primary, secondary, municipal and park/institutional roads in the northwest 25 counties. Machine classification counts were conducted on the primary (600) and secondary (400) systems. Machine volume counts were made on the primary (300), secondary road (5,300), municipal street (4,000), and park/institutional road (100) systems. Turning movement counts (650) were conducted at selected locations on the interstate, primary, secondary and municipal systems. Information was gathered on motorcycle helmet usage and vehicle occupancy as part of the count program. Screenline and cordonline counts (200) were completed in the Sioux City area. All traffic information was entered on the base record to facilitate use in HPMS, pavement management, needs studies, and sufficiency studies as well as highway planning and design studies. Various traffic maps were prepared and distributed. Two ATR stations were installed and repairs were made at 24 sites. A work plan was developed to address the requirements of the TMS/H.

##### **Proposed 1997**

Traffic volume, velocity and classification data will be collected using the 125 Automatic Traffic Recorder network. Monthly and annual reports will be prepared and distributed; computer tapes will be submitted to the FHWA. Traffic monitoring and weigh-in-motion equipment will be purchased. The summer count program will include over 11,000 counts on the primary, secondary, municipal, and park/institutional roads in the southwest 25 counties. Machine classification counts will be conducted on the interstate (900), primary (600) and secondary (400) systems. Machine volume counts will be made on the primary (400), secondary (5,000), municipal (3,500) and park/institutional (100) systems. Turning movement counts (650) will be conducted at selected locations on the interstate, primary, secondary and municipal systems. Information will be gathered on motorcycle helmet usage and vehicle occupancy as part of the count program. Screenline and cordonline counts (100) are scheduled in the Des Moines and Council Bluffs areas. Traffic maps will be prepared and distributed. All traffic information will be entered on the base record to facilitate use in HPMS, pavement management, needs studies, and sufficiency studies as well as highway planning and design processes. Two ATR stations will be upgraded: one on municipal primary, and one on municipal streets. Equipment replacement is included.

## 1996 SUMMER COUNT AREA



### 1. Automatic traffic recorders - 702

1996 Program	1996 Actual Expenditures	1997 Program
\$ 280,600	\$ 316,965	\$ 290,000

### 2. Primary road traffic counts - 720

1996 Program	1996 Actual Expenditures	1997 Program
\$ 403,600	\$ 283,801	\$ 410,000

### 3. Secondary road traffic counts - 709

1996 Program	1996 Actual Expenditures	1997 Program
\$ 256,100	\$ 195,650	\$ 230,000

### 4. Urban area traffic counts - 750

1996 Program	1996 Actual Expenditures	1997 Program
\$ 20,400	\$ 12,500	\$ 15,000

## **5. Municipal traffic counts (under 25,000) - 758**

<b>1996 Program</b>	<b>1996 Actual Expenditures</b>	<b>1997 Program</b>
\$ 120,300	\$ 103,502	\$ 112,000

### **B. Vehicle weight surveys - 713**

**Total Estimated Cost: \$ 25,000**

#### **Objective**

The objective is to compile data on vehicle size and weight.

#### **Accomplishments 1996**

Installation and maintenance of Automated Weighing And Classification equipment to meet traffic data requirements of the SHRP program continued. AWAC equipment was installed at the SPS-2 SHRP site located on US 65 in Polk County. AWAC equipment has been installed at fifteen SHRP locations. (All work associated with the SHRP program was charged to function 777.)

#### **Proposed 1997**

Installation and maintenance of AWAC equipment to meet traffic data requirements of the SHRP program will continue. Some of the WIM equipment currently in place at SHRP locations will require maintenance this summer. This work will include the replacement of sensors and replacement of flexane over sensors. All work associated with the SHRP program will be charged to function 777. AWAC data collected at SHRP locations will be reviewed and analyzed to determine the feasibility of installing similar equipment at existing ATR sites as a part of our traffic monitoring program. New equipment will also be continuously reviewed and evaluated as it comes into the market. Selection of these additional AWAC sites will include consideration of the Traffic Monitoring Guide recommendations.

<b>1996 Program</b>	<b>1996 Actual Expenditures</b>	<b>1997 Program</b>
\$ 25,400	\$ 0	\$ 25,000

**C. Vehicle speed surveys - 712****Maintenance Activity****Objective**

This activity is conducted to monitor speed limit compliance

**Accomplishments 1996**

The level of 55 mph and 65 mph highway speed limit compliance was monitored quarterly at 18 ATR sites. Additional data were collected and FHWA reports were submitted by the Office of Maintenance.

**Proposed 1997**

The Maintenance Division will continue to monitor speed compliance and submit reports.

**1996 Program**

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**1996 Estimated Expenditures**

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**1997 Program**

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**D. Origin and destination surveys - 726****Total Estimated Cost: \$ 2,000****Objective**

Provide users with historical origin and destination data.

**Accomplishments 1996**

Requests for historical data were filled from microfilm records.

**Proposed 1997**

Requests for historical data will be filled.

**1996 Program**

\$ 2,000

**1996 Actual Expenditures**

\$ 0

**1997 Program**

\$ 2,000

**E. Highway traffic forecasting - 739****Total Estimated Cost: \$ 75,000****Objective**

The objective of highway traffic forecasting is to analyze historical vehicle volumes and travel patterns (where available) and to develop accurate projections of the future levels of traffic.

### **Accomplishments 1996**

One hundred fifty requests (125 rural and 25 urban) have been completed for traffic forecasts, road-user benefit-cost analyses, intersection turning movement studies and forecasts of equivalent single axle loads for pavement determinations. Review of traffic analysis for four interstate interchange justification reports were completed.

### **Proposed 1997**

Approximately 185 requests (155 rural and 30 urban) for traffic forecasts for the same purposes are anticipated during FY 1996. It is expected that two interchange justification reports will be reviewed.

#### **1996 Program**

\$ 74,600

#### **1996 Actual Expenditures**

\$ 72,266

#### **1997 Program**

\$ 75,000



## **IV. Mapping and Graphics - 705**

**Total Estimated Cost: \$ 550,000**

### **Objective**

The objective is to produce and maintain a digital cartographic data base for maps of transportation systems and related information for map production and as a base for a statewide geographic information system (GIS). This includes the management of files, development of applications and the development of production procedures.

### **Accomplishments 1996**

#### General Mapping

Activity during FY 1996 included the development or updating of: Iowa transportation map, state highway map, primary road surface width and vertical clearance map, interstate highway map indicating vertical clearance, vertical clearance diagrams, updating 237 of the 1995 highway and street maps, mailing 93 of the 1996 highway and street maps for update, county township maps, H&T maps, DOT transportation center maps, rail company abandonment plans map, rail-road map, ALAS node interchange diagrams, ALAS node maps, and Iowa publicly owned airports map.

Special maps were prepared for: Maintenance Division, Program Management, Project Planning, Systems Planning, Director's Staff, and Transportation Regions.

#### Secondary road attribution and municipal road attribution

A linkage is being established between the secondary road line work on the H&T county maps and the secondary road base record. The same is being done for the municipal line work. Graphic elements in the cartography design files will be identified with the corresponding control numbers from the Base Record. This results in an addressable link between the two information systems allowing Transportation Data to further automate the secondary and municipal mapping process. To achieve this goal, programs are being developed to add user-defined attributes to the graphic elements.

#### GIS

An attempt was made to make the Intergraph geographic information system (GIS) software work in a multi-user environment. Current software restrictions made this environment unworkable. To compensate for these restrictions, the GIS was set up on a project-by-project basis. A GIS implementation plan was developed by the Iowa Transportation Center. This plan identifies existing data, needs, and implementation hurdles. One result of this plan is a GIS steering committee to coordinate GIS implementation for the DOT. This committee is currently working on where to place GIS in the agency and defining a GIS coordinator's position.



### ALAS nodes

Accident Location and Analysis System (ALAS) node map plotting was refined. The number of files required to plot a county was reduced from four to one per county. Attributed plotting shapes were added to all 99 ALAS node graphic files to enable automated batch plotting from the command line. This enhancement will greatly reduce the time needed for maintaining and plotting ALAS node maps. Staff began working with the Office of Driver Services to provide on-line access to the ALAS maps.

### **Proposed 1997**

The cartography section will continue to update and produce state, county, city and special maps with CADD. Staff will develop a procedure for converting map files to metric and the Lambert Conformal Conic Projection and the North American 1983 datum. The tie between graphics and the primary base record will be updated and staff will continue to develop the graphics tie to the secondary and municipal system. The development of state park and institution maps will also be continued.

Efforts to add addressable links to the cartography design files will continue. Five temporary employees will be hired during the summer of 1996 to facilitate this effort. GIS staff will continue their efforts to utilize and enhance the GIS for special projects. The GIS committee will further define implementation issues for the agency. Update efforts for the ALAS node maps will continue.

**1996 Program**  
\$ 665,500

**1996 Actual Expenditures**  
\$ 399,789

**1997 Program**  
\$ 550,000

## **V. Statistics - 701**

**Total Estimated Cost: \$ 350,000**

### **A. Highway statistics - 701**

#### **Objective**

To maintain current highway route mileage, route descriptions and facility statistics in order to provide summary reports.

#### **Accomplishments 1996**

The Office of Transportation Data maintained the current route mileage and route descriptions for city, county and state streets and highways. The annual required reports were submitted to the FHWA by electronic media and included summaries of mileage, vehicle miles, bridge and HPMS data. The data for these reports was extracted from the Base Record data base. The Base Record is a data base used to store data collected, updated, monitored and managed under functions 701, 728, 733, 727, 702, 720, 709, 750, and 757. The ALAS node system was updated and maintained for the Primary Road System.

#### **Proposed 1997**

The Office of Transportation Data will maintain current route mileage for city, county and state streets and highways. Annual reports will be submitted to the FHWA by magnetic tape and will include the summary mileage, bridge and other HPMS information. Vehicle mile statistics will be computed during the year.

The ALAS node system will be updated and maintained for the Primary System.

### **B. Motor vehicles, operators, and fuel statistics - 701**

#### **Objective**

To compile information on motor vehicles, operators, fuel and motor carriers in order to provide summary reports.

#### **Accomplishments 1996**

Data were compiled, responses were made to information requests and the following FHWA reports were submitted by the Office of Planning Services:

- FHWA-551M Monthly Motor Fuel Consumption
- FHWA-556 State Motor Fuel Tax Receipts and Initial Distribution by Collection Agencies.

- FHWA-561 State Motor Vehicle Registrations, Registration Fees, and Miscellaneous Receipts.
- FHWA-562 State Driver Licenses and Fees.
- FHWA-571 Receipts from State Taxation of Motor Vehicles Operated for Hire and Other Motor Carriers.
- FHWA-566 State Vehicle Registration Fees and Other Receipts; Initial Distribution by Collecting Agencies

#### **Proposed 1997**

Data will be compiled, responses will be made to requests for information, and the same FHWA reports will be made by the Office of Planning Services.

### **C. Financial statistics - 701**

#### **Objective**

To compile information on state, county and city highway finances in order to prepare summary reports.

#### **Accomplishments 1996**

The Office of Transportation Data coordinated the Municipal Street Construction Program and the Street Finance Reports as required by Iowa law. The following reports were prepared by the Offices of Transportation Data, Local Systems and Accounting:

- FHWA-531 State Highway Income
- FHWA-532 State Highway Expenditures
- FHWA-536 Local Highway Finance Report
- FHWA-534 Highway Capital Outlay and Maintenance Expenditures

#### **Proposed 1997**

Data will be compiled, local reporting will be coordinated, and the same reports will be prepared.

<b>1996 Program</b>	<b>1996 Actual Expenditures</b>	<b>1997 Program</b>
\$ 377,200	\$ 254,656	\$ 350,000

## **VI. Transportation Management Systems - 754**

**Total Estimated Cost: \$ 600,000**

Although the requirement to develop and implement transportation management systems has been removed, the Iowa DOT has committed to their completion. Systems are being developed and implemented by a combination of DOT staff and outside contracts. The FY 1997 program includes funding for outside development contracts.

### **A. Pavement, Bridge and Safety Management Systems - 754**

#### **Objective**

All management systems affect planning, programming and funding, and the network level management systems must be accomplished to provide assistance to produce a cost-effective transportation system.

#### **Accomplishments 1996**

Work plans have been developed for all management systems. Pavement management is implementing optimization for the NHS and automated data collection on federal-aid eligible roadways will begin this year. Bridge management data collection has begun.

#### **Proposed 1997**

Continue to develop and implement the management systems.

### **B. Congestion Management System - 754**

#### **Objective**

The objective of a CMS is to identify areas where congestion occurs or may occur.

#### **Accomplishments 1996**

Implementation of the CMS work plan began and system design and data collection techniques are being investigated. Congested corridors in metropolitan areas were identified through analysis of volume to capacity ratios. A survey also identified corridors perceived as congested by motorists.

#### **Proposed 1997**

Work will proceed on the CMS toward the goal of collecting travel time data in six MPOs that have where interest has been expressed in continued participation in the CMS process.

## **C. Public Transportation Facilities and Equipment Management System - 754**

### **Objective**

The objective of a PTMS is to collect and analyze information on the condition and cost of transit assets on a continuing basis. The information is used to manage the capital resources of public transit systems.

### **Accomplishments 1996**

A project methodology for rolling stock was developed. It was approved by the Iowa Public Transit Association and used to program 1996 rolling stock projects.

### **Proposed 1997**

Implementation of the PTMS will continue with investigation of project selection methods to prioritize transit facility projects.

## **D. Intermodal Management System - 754**

### **Objective**

The objective of an IMS is to help identify needs for improvement in the connection between modes and to assemble data that can be used to evaluate the existence and need for modal choices at the corridor level.

### **Accomplishments 1996**

Implementation of the IMS continued. Accomplishments to date include customer surveys of intermodal facilities to identify transportation barriers and identification of possible performance measures and standards

### **Proposed 1997**

Implementation of the IMS will continue toward the goal of having a system operational to begin providing projects and programs for consideration in developing metropolitan and statewide transportation plans and improvement programs.

### **All Management Systems**

**1996 Program**  
\$ 187,300

**1996 Actual Expenditures**  
\$ 93,600

**1997 Program**  
\$ 600,000

## **VII. Transportation Systems Planning**

### **A. Highway sufficiency ratings - 727**

**Total Estimated Cost: \$ 35,000**

#### **Objective**

The purpose of the primary highway sufficiency ratings is to objectively measure each primary road section and structure in the state against desirable levels of service based on structural adequacy, safety, and service.

#### **Accomplishments 1996**

Structural adequacy ratings and other base record data relative to sufficiency ratings were updated to reflect the condition of the primary system as of January 1, 1996. All road sections and major structures were evaluated and the results published as the 1996 Primary Road Sufficiency Log. Preparation of the log also required the completion and testing of the sufficiency computer programs which were altered to process metric road and structure input data, and the conversion of the report to summarize the results in metric format.

#### **Proposed 1997**

The 1997 Primary Road Sufficiency Log will be produced from the department's metric data base. Structural adequacy ratings will be updated for all primary roads and bridges, and will be added to the January 1, 1997 database file. Other information on current accident experience and posted load limitations on structures will also be prepared. The sufficiency analysis will then be repeated and the 1997 log prepared.

**1996 Program**  
\$ 40,200

**1996 Actual Expenditures**  
\$ 21,686

**1997 Program**  
\$ 35,000

### **B. Highway needs study - 733**

**Total Estimated Cost: \$125,000**

#### **Objective**

The Quadrennial Needs Study is a measure of the construction, maintenance, and administration needs of Iowa's 112,000 mile road system. It provides a cost estimate of needs over the next 20 years on all primary, secondary, municipal, and state park and institutional roads, structures, and rail crossings.

#### **Accomplishments 1996**

During 1996, the 1994 Iowa Quadrennial Need Study was updated a second time to further adjust the results of the January, 1995 update of the study by addressing changing county needs

due to the transfer of facilities between the state and counties which occurred during calendar year 1995.

#### **Proposed 1997**

The department's data base will be updated annually to add new functional classification changes, construction activity, and system modifications. The annual update will be completed to address changes in county needs due to the transfer of facilities between the state and the counties during calendar year 1996. Initial work to collect information from cities, counties, other Iowa DOT offices and divisions, and other sources will begin in early 1997 for use in the preparation of the 1998 Quadrennial Need Study. Staff will also begin the testing of the necessary metric adaptation of the need study computer programs and training of new staff assigned to the project.

<b>1996 Program</b>	<b>1996 Actual Expenditures</b>	<b>1997 Program</b>
\$ 87,300	\$ 95,538	\$ 125,000

#### **C. RISE planning - 762**

**Total Estimated Cost: \$ 110,000**

##### **Objective**

The objective of the RISE program is to promote economic development in Iowa through construction or improvement of roads and streets.

##### **Accomplishments 1996**

Work was done to complete the review and analysis of 18 immediate opportunity and 12 local development projects. Projects were presented to the Transportation Commission for approval.

#### **Proposed 1997**

Submitted applications for local development and immediate opportunity projects will be thoroughly evaluated and recommended actions will be presented to the Transportation Commission.

<b>1996 Program</b>	<b>1996 Actual Expenditures</b>	<b>1997 Program</b>
\$ 112,700	\$ 50,340	\$ 110,000

#### **D. Statewide transportation planning**

##### **1. Statewide long-range intermodal transportation planning - 763**

**Total Estimated Cost: \$ 850,000**

##### **Objective**

The objective of statewide long-range intermodal transportation planning is to establish a vision of Iowa's future transportation infrastructure system based on broad public involvement and

resulting in a transportation system that supports Iowa's economy by being energy efficient, environmentally and socially responsible, and cost efficient.

### **Accomplishments 1996**

Staff continued the development of the state transportation plan and state-regional and -MPO partnerships. The regional and MPO planning processes provide a local basis for the development of the statewide plan. Development was completed and analysis begun on system alternatives. Development of a statewide commodity flow model continued with completion of data collection on the grain-flow model.

### **Proposed 1997**

The state transportation planning process will continue with participation of the public through a variety of efforts including the use of ICN meetings, surveys of public opinion, and advisory committees. Transportation system alternatives will be analyzed and presented to the public. The public process will provide the foundation for the selection of a preferred alternative and the updated transportation system plan. Management systems will continue to be developed and integrated into the planning process. Continued strengthening of the regional and MPO planning process will include workshops, management system coordination and the development of improved electronic communications and data exchange. The testing and use of the grain flow model will continue as the first part of a more comprehensive statewide commodity flow model. The cost of FY 1997 activity on this study is \$280,032. Work will continue on *Iowa in Motion*, including: selection and documentation of a preferred system alternative; initiation of work on modal or system implementation efforts; and coordination of MPO and Regional plans with the statewide plan.

<b>1996 Program</b>	<b>1996 Actual Expenditures</b>	<b>1997 Program</b>
\$ 917,132	\$ 519,091	\$ 850,000

## **2. Airport planning - 765**

### **Non-participating Item**

#### **Objective**

The objective of airport planning is to provide policy guidance for the Transportation Commission on making investments in Iowa's airport system and aviation programs. Aviation is an integral part of the state's overall transportation system and aviation plans will be integrated into the state multi-modal long-range transportation plan.

### **Accomplishments 1996**

The following airport planning activities were completed or initiated: compilation of ten-year capital improvement needs into a data base provided by the FAA; contracts to prepare airport



layout plan updates for four publicly owned general aviation airports; completed an update to the 1989 Iowa Aviation Weather System Plan.

#### **Proposed 1997**

Additional updates of airport layout plans at up to four publicly owned general aviation airports will be prepared. Pavement management surveys will be completed at the state's five largest commercial service airports. The Iowa Aviation System Plan will be updated in conjunction with development of the state's long range transportation plan. The FAA will be provided with updated ten year airport capital improvement needs information.

<b>1996 Program</b>	<b>1996 Actual Expenditures</b>	<b>1997 Program</b>
Non-participating activity	---	---

### **3. Public transit planning - 745**

**Total Estimated Cost: \$ 65,000**

#### **Objective**

The objective of public transit planning is to provide assistance to public transit providers and regional and metropolitan planning agencies so the resources of existing transit programs and available funds can be used effectively and to provide the Transportation Commission with policy and program guidance concerning public transportation services.

#### **Accomplishments 1996**

Planning assistance grants were administered for 25 local and regional and metropolitan planning agencies. The Public Transit Management System was completed and implemented.

#### **Proposed 1997**

Administration will continue on planning assistance grants to transportation planning affiliations. Development will continue on the State Transit Plan in coordination with the state long-range transportation plan.

<b>1996 Program</b>	<b>1996 Actual Expenditures</b>	<b>1997 Program</b>
\$ 57,000	\$ 64,700	\$ 65,000

### **4. Railroad planning - 766**

**Non-participating Item**

#### **Objective**

The objective of rail planning is to provide the Transportation Commission with policy and program guidance on rail issues and investment of state/federal rail funds.

## **Accomplishments 1996**

Information on Iowa's rail lines, operations and services were summarized. All Iowa rail maps were updated. Staff received and commented on the merger application of the Union Pacific and Southern Pacific Railroads.

## **Proposed 1997**

The updated state rail plan will be used to help develop state transportation plan and the intermodal management system. Staff will continue to update rail facts and monitor rail freight commodity flow. Rail mergers and AMTRAK passenger service will be monitored to determine the impact to Iowa users.

<b>1996 Program</b>	<b>1996 Actual Expenditures</b>	<b>1997 Program</b>
Non-participating activity	---	---

### **5. River planning - 767**

### **Non-participating Item**

#### **Objective**

The objective of river transportation planning is to provide the Transportation Commission with policy guidance on river transportation issues and Iowa's river port facilities.

## **Accomplishments 1996**

River transportation commodity flows were monitored and data were maintained. Staff has reviewed the Upper Mississippi River/Illinois Waterway Study by the U. S. Army Corps of Engineers. Staff has begun to collect barge terminal information to help develop the intermodal management system

## **Proposed 1997**

River transportation planning issues will be incorporated into the state long-range transportation plan paying particular attention to the intermodal aspects of river transportation. Data will be gathered on each river port facility as input into the intermodal management system.

<b>1996 Program</b>	<b>1996 Actual Expenditures</b>	<b>1997 Program</b>
Non-participating activity	---	---

### **6. Scenic byways planning - 736**

### **Non-participating Item**

#### **Objective**

The objective of scenic byways planning is to implement a scenic byways program as established by state code and federal programs.

### **Accomplishments 1996**

The final report in the inventory of scenic and natural resources along the Great River Road was filed in January 1996. This project was done in cooperation with the Iowa Natural Heritage Foundation and covered 100 miles of roadway.

### **Proposed 1997**

An ongoing scenic byways program is being considered for development. Preliminary research is currently being done to determine a development process. A project to research, inventory and evaluate important historic roads and trails in Iowa will be conducted.

<b>1996 Program</b>	<b>1996 Actual Expenditures</b>	<b>1997 Program</b>
Non-participating activity	---	---

### **7. Recreational trails planning - 737**

**Non-participating Item**

#### **Objective**

To administer the recreational trails by providing planning assistance and funding for trails projects.

#### **Accomplishments 1996**

Provided funds to three trails projects and expect to fund two additional projects from the January funding cycle.

#### **Proposed 1997**

Funding applications will be accepted in July and January to determine trails funding proposals for the coming year. Work will continue to bring all trail development through the delays caused by 1993 flooding.

<b>1996 Program</b>	<b>1996 Actual Expenditures</b>	<b>1997 Program</b>
Non-participating activity	---	---

## **E. Urban transportation planning**

**Total Estimated Cost: \$ 1,204,554**

### **1. Urbanized areas - 707**

#### **Objective**

The objectives of the metropolitan transportation planning program for Iowa urbanized areas are to: coordinate local and state planning activities and programs with federal guidelines; administer FHWA financial assistance for planning; provide technical and administrative assistance; provide computer support for maintaining and developing urban area travel forecasting models; and prepare project-specific traffic estimates and forecasts.

#### **Accomplishments 1995**

All metropolitan areas: Common planning activities accomplished in each of Iowa's eight urbanized area metropolitan planning organizations (MPOs) during fiscal year 1996 included: preparation and approving a unified planning work program (UPWP) and a transportation improvement program (TIP); conducting public input sessions on the state transportation improvement program; initiating the processes to accomplish ISTEA management systems; coordinating the MPO and statewide long-range transportation plans.

In addition, the Iowa DOT staff administered the FHWA planning assistance (PL) program; participated in MPO transportation committee meetings; prepared metropolitan area highway project traffic estimates; assisted the MPOs in validating and applying the travel forecasting models; and cooperated with the MPOs in developing and implementing urban area major street and highway jurisdictional responsibility plans.

Individual metropolitan areas: Individual MPO planning accomplishments have been detailed in the Transportation Planning Work Program (TPWP) prepared by each MPO which has been submitted to the FHWA for review and approval.

#### **Proposed 1997**

All metropolitan areas: Common planning activities expected to be accomplished in each of Iowa's eight MPOs during fiscal year 1996 include: preparing and approving a TPWP and a TIP; participating in the public review of the STIP; continuing the development and implementation of the congestion public transit and intermodal management systems in cooperation with the metropolitan and regional planning agencies, transit operators and others; reviewing metropolitan long-range plans in the light of policy directions to be established as a part of the "Iowa in Motion" statewide long-range planning effort.

Iowa DOT staff involvement will reflect a growing emphasis on the role of its ten transportation center planners. Major FY 1997 DOT activities in support of the MPO process will include: administration of the FHWA PL program; participation in MPO transportation committee meetings; preparation of metropolitan area highway project traffic estimates; assistance to MPOs in

refining and applying the travel forecasting models; and cooperation with the MPOs in development and implementation of the urban area major street and highway jurisdictional responsibility plans.

Individual metropolitan areas: Each MPO's proposed activities are set forth in their FY 1997 TPWP which has been reviewed and approved by the FHWA division office.

Following are programmed and actual expenditures by urbanized area:  
SPR funds:

	1996 Program	1996 Actual Expenditures	1997 Program
Cedar Rapids	\$ 33,200	\$ 6,527	\$ 18,500
Council Bluffs	21,200	6,830	19,500
Davenport	39,500	4,646	13,000
Des Moines	71,300	29,931	45,000
Dubuque	37,800	8,944	17,500
Iowa City	22,600	5,019	12,500
Sioux City	21,200	5,554	14,000
Waterloo	<u>39,500</u>	<u>14,952</u>	<u>32,000</u>
Total	\$ 286,300	\$ 82,403	\$ 172,000

PL funds (Includes 20% local match):

	1996 Program	1996 Estimated Expenditures	1997 Program
Cedar Rapids	\$ 170,388	\$ 170,388	\$ 182,741
Council Bluffs	118,016	47,108	39,800
Davenport	218,186	132,500	138,750
Des Moines	293,975	293,975	321,204
Dubuque	115,085	69,650	70,000
Iowa City	126,661	54,318	56,084
Sioux City	114,718	114,719	111,705
Waterloo	<u>111,598</u>	<u>111,599</u>	<u>112,270</u>
Total	\$1,268,627	\$ 1,065,167	\$ 1,032,554

## **2. Urban areas (less than 50,000) - 708      Total Estimated Cost: \$ 15,000**

### **Objective**

The objective for the small (less than 50,000) urban areas is to provide transportation planning and traffic forecasting as requested, limited by the staff time available.

### **Accomplishments 1996**

TRANPLAN software was furnished on request. Traffic forecasting was completed as needed.

### **Proposed 1997**

Transportation planning and traffic forecasting will be completed as needed.

<b>1996 Program</b>	<b>1996 Actual Expenditures</b>	<b>1997 Program</b>
\$ 18,400	\$ 8,750	\$ 15,000

### **F. Regional transportation planning - 704      Total Estimated Cost: \$ 180,000**

#### **Objective**

The objective of regional transportation planning is to provide local elected officials, public and private transportation interests, and others who are interested in or affected by transportation an opportunity to be directly involved in the decision-making process.

### **Accomplishments 1996**

Eighteen regional planning affiliations have been established to assist the department with the implementation of the ISTEA in Iowa. Transportation planning work programs and transportation improvement programs have been received from these regional planning affiliations. These affiliations have completed their long-range intermodal transportation plans.

### **Proposed 1997**

The 18 regional planning affiliations will update their long-range intermodal transportation plans as appropriate to be consistent with *Iowa in Motion*. These affiliations will submit their FY 1997 - 1999 three-year transportation improvement programs which will have gone through their public participation processes.

<b>1996 Program</b>	<b>1996 Actual Expenditures</b>	<b>1997 Program</b>
\$ 201,200	\$ 109,272	\$ 180,000



## VIII. Project Planning

Total Estimated Cost: \$ 600,000

### A. Project planning and environmental - 738

#### Objective

The objective of this activity is to perform necessary studies, technical and environmental, in order to identify alternative locations, estimate costs, assess construction feasibility, determine environmental impacts, identify sensitive areas, propose mitigation plans, and obtain the necessary environmental clearances and approvals for highway improvement projects.

#### Accomplishments 1996

Environmental documentation and corridor public hearing requirements were completed for the appropriate projects scheduled in the Five-Year Transportation Improvement Program.

#### Proposed 1997

Environmental documents and hearings will be completed and FHWA approval requested for the appropriate projects listed in the Five-year Iowa Transportation Improvement Program and the Group I Planning studies as established by the Transportation Commission.

1996 Program	1996 Actual Expenditures	1997 Program
\$ 623,500	\$ 553,141	\$ 600,000

### B. Highway planning - 722

Non-Participating Item

#### Objective

This activity includes all project-related planning work accomplished after the design public hearing for federal-aid projects, and all preliminary project development activities as above for non-federal-aid projects.

#### Accomplishments 1996

Design public hearings were held and the necessary approvals obtained for all projects which had been developed to the stage of right of way design in the Department's FY 1996 production schedule.

#### Proposed 1996

Design public hearings will be conducted for those projects shown for hearing activity during FY 1997 in the Department production schedule.

1996 Program	1996 Actual Expenditures	1997 Program
Non-participating	---	---





## **IX. Transportation Enhancements Planning - 735**

**Total Estimated Cost: \$ 45,000**

### **Objective**

To ensure that transportation enhancement projects are identified, ranked and funded consistent with provisions of the Intermodal Surface Transportation Efficiency Act.

### **Accomplishments 1996**

Transportation enhancement projects programmed by the 18 Regional Planning Affiliations and 8 Metropolitan Planning Organizations were monitored. These regional projects were incorporated into the Statewide Transportation Improvement Program (STIP). Statewide projects were selected on the recommendation of enhancement review committees in three project categories: historical and archaeological; scenic and natural resources; and trails and bicycles.

### **Proposed 1997**

Regional enhancement projects will be programmed and incorporated into the STIP and development will continue on past year's projects. Department staff will continue to assist RPAs and MPOs and monitor the obligation of federal funds. Statewide projects will be selected and approved.

**1996 Program**  
\$ 48,400

**1996 Actual Expenditures**  
\$ 15,000

**1997 Program**  
\$ 45,000



## **X. State Transportation Improvement Program**

### **A. Statewide Transportation Improvement Program (STIP) - 753**

**Total Estimated Cost: \$ 150,000**

#### **Objective**

The purpose of this activity is to produce a comprehensive and fiscally constrained Five-Year Program and Three-Year STIP. Included are all transportation investments under the direction of the DOT Commission using state and federal funds: airport investments, transit funding, railroad investments, recreational trails funding, park & institutional road improvements, traffic safety projects, RISE investments, highway investments, enhancements and planning study commitments.

#### **Accomplishments 1996**

During 1996, after a year of experience working with metropolitan planning organizations (MPOs) and regional planning affiliations (RPAs), general guidelines were developed to document the prescribed programming processes. The 1996 STIP is a three-year fiscally constrained federal-aid program using input from local planning agencies to improve public input and public awareness in the programming process.

#### **Proposed 1997**

The 1997 - 1999 STIP and 1997 - 2001 Five Year Program will be completed and will include RPA and MPO input and participation.

<b>1996 Program</b>	<b>1996 Actual Expenditures</b>	<b>1997 Program</b>
\$ 188,100	\$ 69,264	\$ 150,000

### **B. Park and institutional roads program - 768**

**Non-participating Item**

#### **Objective**

The objective of this activity is to administer a fund which provides for maintaining and improving roadways within the boundaries of state-owned lands.

#### **Accomplishments 1996**

The State Capitol complex was added to the list of eligible participants. The available funds were targeted to the eight participating state agencies, and projects were developed in coordination with the Department to provide improved transportation facilities.

#### **Proposed 1997**

The staff will continue to coordinate funding for the park and institutional roads program.

<b>1996 Program</b>	<b>1996 Actual Expenditures</b>	<b>1997 Program</b>
Non-participating activity	---	---



## **XI. Research, Development and Technology Transfer**

The Intermodal Surface Transportation Efficiency Act provided increased funding for state research programs by requiring that at least a minimum of 1/2 percent of a state's federal funds be used for a research, development and technology transfer (RD&T) program. Federal regulations also require that each state develop a management plan for the administration of its RD&T program. The Iowa Department of Transportation has certified that it is in compliance with the act and has filed an approved management plan. The implementation of the management plan during FY 1996 has progressed to the point of a systematic selection of projects for which second stage problem statements are being developed. The work program for FY 1997 will reflect this systematic and comprehensive process of setting research priorities, selecting research activities and reporting results. A broadly based Strategic Plan Committee will be formed to set the long term goals of the program. Focus groups have helped to identify specific alternative approaches for each priority research area. A Research Advisory Committee including voting members from each DOT Division, each focus group, the Iowa Highway Research Board and the MPOs and RPAs has prepared a draft RD&T work program, is selecting Project Committee members, will monitor program resources, and will develop a peer review process. A Project Committee will be formed for each RD&T project to develop second stage problem statements, select the research team, manage research contracts, review reports, and provide assistance and advice as appropriate. As soon as project proposals and budgets are approved this SPR Program will be amended to include them and federal-aid authorization will be sought prior to project initiation.

### **A. Administration**

**Total Estimated Cost: \$ 124,300**

#### **1. Research monitoring and technical support - 771**

##### **Objective**

The objectives are to monitor transportation research activities at the national and regional levels, keep DOT staff informed of current developments, prepare research proposals and work plans, and administer research contracts.

##### **Accomplishments 1996**

DOT research staff contributed to the General Pavement Studies and the Long-Term Pavement Performance tests in Iowa and advised the engineering staff of current research developments. Research and technology publications were monitored as a source for technology transfer projects. Staff provided mathematical and statistical analysis and data processing assistance as needed and requested.

A number of changes in work zone traffic control devices were tested and evaluated by use of surveys and traffic monitoring devices. Five changes were tested by a number of different contractors at eight different locations around the state. Assistance in survey design, survey analysis and speed and volume analysis were completed in FY 1996. In addition to the contractors, 18

maintenance garages were selected to test some of the configurations. A final report will be completed by the Engineering Division in FY 1997

### **Proposed 1997**

Research administration will continue to provide direct support to research and technology transfer activities and provide analytical expertise to related activities.

<b>1996 Program</b>	<b>1996 Actual Expenditures</b>	<b>1997 Program</b>
\$ 35,000	\$ 62,919	\$ 50,000

## **2. TRB Research Correlation Service support - 771**

### **Objective**

The objective is to support the dissemination of research results through the Transportation Research Correlation Service.

### **Accomplishments 1996**

The annual subscription to the Transportation Research Correlation Service was paid.

### **Proposed 1997**

Iowa will continue to support the Transportation Research Correlation Service through the annual subscription assessment.

<b>1996 Program</b>	<b>1996 Actual Expenditures</b>	<b>1997 Program</b>
\$ 74,300	\$ 74,300	\$ 74,300

## **B. National pooled-fund studies - 776**

**Total Estimated Cost: \$ 491,098**

Iowa will continue to participate in pooled-fund research. Several projects included in the FY 1996 work program are multi-year efforts with additional funding programmed for FY 1997. New projects will be added from the FHWA FY 1997 solicitation when that process is complete.

HPR-4(195)	National Cooperative Highway Research Program	\$176,098
HPR-3(017)	Midwest States Crash Testing Program	52,000
HPR-3(020)	ITS Study (ENTERPRISE)	75,000
SPR-3(037)	Public Perception of Midwest Highway Pavements	95,000
SPR-2(170)	High Strength Concrete for Bridges	8,000
SPR-2(174)	Evaluate CRM in Asphalt Pavements	4,000
SPR-2(175)	Develop Standard Reference Soils	1,000
SPR-2(177)	Test Prestressed Bridge Girders	3,000
SPR-2(178)	Seasonal Changes in Pavement Materials	4,000

SPR-2(179)	Load Testing of Instrumented Pavements	5,000
SPR-2(183)	Development of Computer Based Training Lessons	4,000
SPR-2(184)	Long Term Field Monitoring of Mitigating Corrosion Inhibitors	8,500
SPR-2(185)	Fiber Optic Sensors to Monitor Impact of Trucks on Pvmnts & Str	4,500
SPR-2(186)	Intersection Design Improvements for Safety Management	40,000
SPR-2(188)	Crash Tested Safety Appurtenances for Work Zones	<u>11,000</u>
		\$491,098

## **C. General implementation - 774**

**Total Estimated Cost: \$ 40,000**

### **Technology transfer**

#### **Objective**

The objectives are to promote new technology and provide technical support to other DOT offices.

#### **Accomplishments 1996**

Research staff in the Planning and Programming Division continued to support implementation of the pavement management program by assisting with the pavement life predictions and 18 kip loadings.

DOT staff continued to participate in the national ITS programs and administer ITS initiatives with the Center for Transportation Research and Education at ISU.

#### **Operational Tests:**

CVO: Automated mileage and stateline crossing operational test (AMASCOT) was completed. The test has proven the feasibility of automated mileage data collection and electronic filing for streamlining state and motor carrier processes for administration of fuel tax (IFTA) and registration (IRP) apportionment. The combination of GPS with other technologies is capable of accurately identifying and recording jurisdictional border crossings and mileage traveled by a vehicle and this data can meet IFTA and IRP requirements.

ATIS: Completed HERALD phase I, an en-route driver advisory system that uses AM subcarriers for information transmission. The use of AM subcarriers offers low data rate service (200 bits per second in the phase I test) that can reach across thousands of square miles of terrain, including mountainous and rural areas, providing access to advanced traveler information service (ATIS) data. The technology used in HERALD is based on squeezing data into an inaudible portion of the spectrum occupied by the broadcast AM signal. Phase I proved the concept and selected the best modulation scheme using the following design parameters: imperceptible in the normal audio program; simple, low-cost receiver; robust in the presence of noise, interference and fading; and minimal difficulty in infrastructure deployment.



## **Proposed 1997**

Staff will continue to provide support to the pavement and safety management programs as they make the transition from technology transfer to operation.

DOT research staff will continue to be active in ITS standards development issues. Iowa will be the lead on HERALD phase II, field evaluation of the AM digital radio subcarrier system and will be a participant in the Mayday emergency notification system tests. These projects are expected to lead to institutions and procedures that will be applicable nationwide.

Global Positioning Systems - Work will continue on the integration of GPS with GIS data files.

Traveler Information - Staff will initiate a project to investigate the feasibility of using AM/FM and Internet to send and access traveler information in rest areas, truck stops, and business and home personal computers. These technologies will also be evaluated as another way to control variable message signs. Existing transportation data streams will be channeled, updated and verified to support the real-time information exchange. Project objectives include: low-cost delivery of traveler information; determination of preferred distribution method; assessment of multi-agency cooperation to maintain and update the data stream; financial evaluation; and assessment of the feasibility of updating variable message signs.

Additional projects may be added when the FY 1997 Iowa DOT Research Plan is approved.

<b>1996 Program</b>	<b>1996 Actual Expenditures</b>	<b>1997 Program</b>
\$ 175,000	\$ 24,644	\$ 40,000

### **D. Highway research support**

**Total Estimated Cost: \$ 150,000**

#### **Objective**

The objectives are to support highway training, research, and technology transfer programs.

#### **Technology transfer - 775**

##### **Accomplishments 1996**

Crack and Patch Surveys - This is a continuing project designed to evaluate potential applications of laser and computer technology as a means of automating surveillance of pavement surfaces. Additional systems would add about \$150,000 for FY 1996. Expected benefits of the project include a greater understanding of these technologies and the practical difficulties of their application. No progress to report. Funding support has prevented moving on with work tasks.

R/WIS - Staff provided technical support to evaluate the AASHTO R/WIS data exchange protocol. Road/weather information systems (R/WIS) are specialized networks which collect, process and disseminate information about road and weather conditions relating to highway transportation. R/WIS information is used by highway maintenance managers to help ensure that snow plowing and deicing operations are timely and cost effective. R/WIS data will also provide warnings to drivers and fleet operators through traveler information systems. An essential requirement for an integrated system is the adoption of standards for R/WIS information exchange between DOTs and other agencies willing to exchange weather information. An earlier AASHTO proposal for data exchange protocol only provided for a limited exchange in the form of character text files. A workshop was held to discuss this approach and recommend changes to the AASHTO R/WIS protocol.

Construction Management System - Iowa is participating in phase two of AASHTO's joint software development program for a Construction Management System. Iowa's share of the project will cost \$515,000 which was committed from FY 1996 funds.

### **Proposed 1997**

RF Transponder Applications - Evaluation of this technology will continue.

Maintenance Concept Vehicle - Staff will continue to work with developers on the application of advanced computer and communications technologies on a maintenance concept vehicle and R/WIS. The objective is to improve the quality and efficiency of maintenance operations by giving field forces access to emerging technology.

Winter highway maintenance primarily comprises of snow removal and sand/salt applications to reduce the risk of frost or ice on the roadway. Pavement temperature and thermal mapping data may play a major role to support decision makers select the most the effective sand/salt mixtures. Mobile measurement from infrared sensors are used to produce continuous readings of air and pavement temperatures along highways. Repeated runs are made under a variety of representative weather conditions. The resulting thermal profiles can be used to interpolate pavement temperature between monitoring stations. Staff will investigate the potential of using pavement temperature and an integrated pavement temperature model to calibrate and validate pavement temperature forecasts received from the Road Weather Information System (R/WIS). The information can be used to identify the location of future pavement sensors and assist in developing guidelines for anti-icing strategies.

Funding for the LTAP program for FY 1997 will be \$110,000.

Additional projects may be added when the FY 1997 Iowa DOT Research Plan is approved.

<b>1996 Program</b>	<b>1996 Actual Expenditures</b>	<b>1997 Program</b>
\$ 715,000	\$ 517,700	\$ 150,000

## **E. Other research (non-participating) - 777**

### **Objective**

Staff time for the general coordination of research programs the have funding sources other than SPR funds is included as a non-participating activity.

### **Accomplishments 1996**

Research staff closed out contracts associated with the Midwest Transportation Center through the FHWA Regional Transportation Center program. The MTC was the regional center for Iowa, Kansas, Missouri and Nebraska. Program administration has shifted to Nebraska.

Staff continued to participate with Strategic Highway Research Program activities related to pavement management and highway project programming.

Staff continued assistance with the ISU Technology Transfer Center.

### **Proposed 1997**

Coordination of activities with private sector partners and the Center for Transportation Research and Education at Iowa State University will continue. Staff will participate in research project selection and will monitor research activities and review reports to ensure objectives are met.

**1996 Program**  
(Non-participating)

**1996 Estimated Expenditures**

**1997 Program**

# Research Project Summary and Index

Project No.	Study Title	Est. \$ FY 97	Iowa DOT Contact	FHWA Contact	Page No.
Research Monitoring and Technical Support - 771					36
	TRB Research Correlation Service	\$74,300	T. Jackson		
	Technical Support	\$50,000	T. Jackson	L. Forney	
Pooled Fund Studies - 776					36
HPR-4(195)	NCHRP	\$176,098	T. Jackson	L. Forney	
HPR-3(017)	Midwest States Crash Testing Pgm.	52,000	D. Little		
HPR-3(020)	ITS Study ENTERPRISE	75,000	J. Whited		
SPR-3(037)	Public Perception of Midwest Highways	95,000	C. I. MacGillivray		
SPR-2(170)	High Strength Concrete for Bridges	8,000	W. Lundquist		
SPR-2(174)	Evaluate CRM in Asphalt Pavements	4,000	J. Heggen		
SPR-2(175)	Develop Standard Reference Soils	1,000	C. Narotam		
SPR-2(177)	Test Prestressed Bridge Girders	3,000	W. Lundquist		
SPR-2(178)	Seasonal Changes in Pavement Mtls.	4,000	B. McWaters		
SPR-2(179)	Load Testing of Instrumented Pvmnts.	5,000	B. McWaters		
SPR-2(183)	Develop Computer Based Training	4,000	G. Marlow		
SPR-2(184)	Monitor Corrosion Inhibitors	8,500			
SPR-2(185)	Fiber Optic Truck Impact Sensors	4,500			
SPR-2(186)	Intersection Design Improvements	40,000			
SPR-2(188)	Crash Test Work Zone Safety Devices	11,000	L. Smithson		
		\$491,098			
General Implementation - 774					
	Technology Transfer				37
	CVO Operational Tests	\$10,000	J. Whited		
	Global Positioning Systems	\$10,000	J. Whited		
	Traveler Information	\$10,000	J. Whited		
	Management System Development	\$10,000			
Highway Research Support - 775					
	Technology Transfer				38
	LTAP	\$110,000	J. Whited		
	Winter Maintenance - R/WIS	\$20,000	J. Whited		
	RF Transponder Applications	\$10,000	J. Whited	B. Baldwin	
	Maintenance Concept Vehicle	\$10,000	J. Whited	S. Deocampo	



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