



U.S. Department of Transportation

Federal Transit Administration
901 Locust Street, Room 404
Kansas City, MO 64106
816-329-3920
816-329-3921 (fax)

Federal Highway Administration
3220 W. Edgewood, Suite H
Jefferson City, MO 65109
573-636-7104
573-636-9283 (fax)

June 26, 2018

Mr. Patrick McKenna, Director
Missouri Department of Transportation
Jefferson City, Missouri 65102

RE: SFY 2019 State Planning and Research Work
Program and SFY FY2018 Annual Report
Missouri Project SPR-PL-00 FY (019)

Dear Mr. McKenna:

In your letter dated June 21, 2018, we received your request for the Federal Highway Administration's (FHWA) and the Federal Transit Administration (FTA) review and approval of the final version of Missouri Department of Transportation's (MoDOT) state fiscal year (SFY) 2019 State Planning and Research (SPR) Work Program and SFY 2018 Annual Report. After prior discussion and review of draft copies, we find the SFY 2019 SPR Work Program satisfactory and approve it as requested, effective July 1, 2018. The MoDOT SFY 2019 SPR Work Program year begins on July 1, 2018 and ends on June 30, 2019.

This approval includes the estimated funding amounts for the Unified Planning Work Programs (UPWPs) for Missouri's eight metropolitan planning areas. However, the UPWPs for each of the Metropolitan Planning Organizations (MPOs) continue to be subject to ONE DOT's individual review and written approval.

The SFY 2018 SPR Work Program and SFY 2018 SPR Annual Reporting data are presented in one planning work product. Please provide our Division Office the addendum that adds the SFY 2018 actual cost to the SFY 2019 SPR Work Program by August 31, 2018 and take steps to close out the SPR-PL-00 FY (18) project within 90 days of the close of the state fiscal year 2018 work program.

If you have any questions, please contact Brad McMahon at FHWA (573) 638-2609 or Jeremiah Shuler at FTA (816) 329-3940.

Mokhtee Ahmad
Regional Administrator
Federal Transit Administration

Sincerely,

For: Kevin W. Ward
Division Administrator, P.E.
Federal Highway Administration

cc: Machelles Watkins, MoDOT
Paige Kempker, MoDOT
Doug Hood, MoDOT
Bill Stone, MoDOT
Dave Ahlvers, MoDOT
Sharon Monroe, MoDOT

State Planning and Research Work Program

**SPR-PL-00 FY (19)
2019 State Fiscal Year
(7/1/18 to 6/30/19)**

And

**SPR-PL-00 FY (18)
2018 State Fiscal Year
(7/1/17 to 6/30/18)**



Missouri Department
of Transportation

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

Table of Contents

List of Abbreviations	2
Preface	5
State Planning	5
Consolidated Planning Grant (CPG)	5
Research, Development and Technology Transfer.....	5
Introduction	6
Financial Summary Sheet	7
Itemized Cost Budget Estimates and Actual Expenditures	9
Part I – Planning	9
Part II – Urban (MPO)	10
Part III – Research – SPR	10
TOTAL MoDOT SPR WORK PROGRAM	11
WORK PLANS	12
Core and Mandated Activities	12
Part I – Planning	12
Part II – Urban Transportation Planning	27
Part III – Research	30
Certification Statement	31
Administration – SPR19ADS	33
Research – SPR19RDS.....	34
Development – SPR19DVS	80
Technology Transfer – SPR19TTS	81

List of Abbreviations

AASHTO – American Association of State Highway and Transportation Officials
AEP – Annual Exceedance Probabilities
APA – American Planning Association
ARAN – Automatic Road Analyzer
ARI – Average Recurrence Intervals
ASTM – American Society for Testing and Materials
ATR – Automatic Traffic Recorder
BEAP – Bridge Engineering Assistance Program
CAP – Compliance Assessment Program
CFR – Code of Federal Regulations
CMF – Cash Modification Factor
CMS – Content Management System
CP – Cathodic Protection
CPG – Consolidated Planning Grants
DOT – Department of Transportation
EERC – Earthworks Engineering Research Center
EMTSP – Equipment Management Technical Services Program
EPG – Engineering Policy Guide
EWG – East-West Gateway Council of Governments
FARS – Fatality Analysis Reporting System
FAST Act – Fixing America’s Surface Transportation Act
FFY – Federal Fiscal Year
FHWA – Federal Highway Administration
FRP – Fiber Reinforced Polymer
FTA – Federal Transit Administration
FTZ – Foreign Trade Zone
GIS – Geographic information system
GPR – Ground-Penetrating Radar
GPS – Global Positioning System
HAL – Highway Accident Location
HMA – Hot-Mix Asphalt
HPMS – Highway Performance Monitoring System
HSM – Highway Safety Manual
HS-SCC – High Strength Self-Consolidating Concrete
HVFA – High Volume Fly Ash
IMISS – Implementing Maintenance Innovations from State to State
ITE – Institute of Transportation Engineers
ITS – Intelligent Transportation System
LED – Light Emitting Diode
LETS – Law Enforcement Technology System
LIDAR – Light Detection and Ranging
LKD – Lime Kiln Dust
LPA – Local Public Agencies
LRFD – Load and Resistance Factor Design
LRS – Linear Referencing System Network

LRTP – Long-Range Transportation Plan
 LTAP – Local Technical Assistance Program
 MACOG – Missouri Association of Councils of Government
 MACTO – Missouri Association of County Transportation Officials
 MAP-21 – Moving Ahead for Progress in the 21st Century
 MARC – Mid-America Regional Council
 MATC – Mid-America Transportation Center
 MDA – Mixture Design and Analysis
 MERIC – Missouri Economic Research and Information Center
 MHTC – Missouri Highway Transportation Commission
 MLS – Master of Library Science
 MoDOT – Missouri Department of Transportation
 MPO – Metropolitan Planning Organization
 MUTCD – Manual on Uniform Traffic Control Devices
 MVFC – Mississippi Valley Freight Coalition
 NCAT – National Center for Asphalt Technology
 NCHRP – National Cooperative Highway Research Program
 NCSC – North Central Super pave Center
 NDT – Non-destructive Testing
 NHI – National Highway Institute
 NTKN – National Transportation Knowledge Network
 NTPEP – National Transportation Product Evaluation Program
 ONEDOT – Federal Highway Administration and Federal Transit Administration
 OTO – Ozarks Transportation Organization
 PCC – Portland Cement Concrete
 PI – Principal Investigator
 PIERS – Port Import Export Reporting Service
 PL – Metropolitan Planning
 PPG – Planning and Policy Group
 QA – Quality Assurance
 QC – Quality Control
 RAS – Recycled Asphalt Shingles
 RCA – Recycled Concrete Aggregate
 RPC – Regional Planning Commission
 RTAP – Rural Technical Assistance Program
 RTS – Right Transportation Solutions
 SASW – Spectral Analysis of Surface Waves
 SCC – Self-Consolidating Concrete
 SDE – Service Desk Express
 SFY – State Fiscal Year
 SHAL – Safety Handbook for Locals
 SICOP – Snow and Ice Pooled Fund Cooperative Program
 SPF – Safety Performance Functions
 SPR – State Planning and Research
 SPT – Standard Penetration Test
 SRTS – Safe Routes to School
 STARS – Missouri Statewide Traffic Accident Records System
 STIP – Statewide Transportation Improvement Program
 STSFA –Transportation Systems Funding Alternative
 TAC – Technical Advisory Committee

TCD – Traffic Control Device
TCOAP – Thin-White Topping Concrete Overlays of existing Asphalt Pavement
TE – Transportation Enhancement
TEAP – Traffic Engineering Assistance Program
TIG – Technology Implementation Group
TKN – Transportation Knowledge Networks
TMC – Transportation Management Center
TMS – Transportation Management Systems
TRB – Transportation Research Board
TP – Transportation Planning
TPF – Transportation Pooled Funds
TSP2 – Transportation Pavement Preservation Program
TTAP –Technology Transfer Assistance Program
TTC – Temporary Traffic Control
TTCC – Technology Transfer Concrete Consortium
TTIC – Technology Transfer Intelligent Compaction
TWLT – Two-Way Left Turn
UAB – Urban Area Boundary
UPWP – Unified Planning Work Program
USGS – United States Geological Survey
UTCOAP – Ultra-Thin White Topping Concrete Overlays of existing Asphalt Pavement
VMT – Vehicle Miles of Travel
WIM – Weigh-in-motion

Preface

This SPR Work Program is prepared as an overview of the MoDOT activities that relate to Section 505, State Planning and Research, of Title 23, United States Code.

This report focuses on three parts. Part I (Planning) describes the state planning activities. Part II (Urban – Metropolitan planning organizations, MPO – CPG) describes the planning activities of the MPO. Part III (Research-SR) describes the technology transfer, development and research activities.

State Planning (SP) funds identify and develop methods to evaluate, prioritize and finance transportation needs.

Consolidated Planning Grant (CPG) funds are distributed to the nine metropolitan areas for their use in urban planning. The combined state and local urban planning work is coordinated into the Unified Work Program for each of the urbanized areas.

Research, Development and Technology Transfer (SR) funds are used for research, and for development and technology transfer activities necessary in connection with the planning, design, construction and maintenance of highway, public transportation and intermodal transportation systems.

The SFY 2019 SPR Work program is describing the proposed work activities and estimated budgets for each SFY 2019 SPR work program work element and the expenditures for each SFY 2019 SPR work program activity and SFY 2018 accomplishments. An administrative action will be completed in September 2018 for the purpose of incorporating the actual expenditure amounts for SFY 2018 work activities into the SFY 2019 SPR Work program. This administrative action will be in the form of an addendum and provided to FHWA for informational purposes. It will be available for viewing on www.modot.org.

Introduction

Planning in general involves a method for accomplishing a desired objective – deciding in advance planning activities for the upcoming year. It is a continuous process aimed at maintaining the entire transportation system. Planning is the orderly and continuing assembly of information – including the history of development, the extent, dimensions, condition, use, economic and social effects, costs and future needs. It includes the analysis of this information for use by the administrators for the development and management of the transportation system in an efficient and cost-effective manner.

MoDOT's Mission:

Our mission is to provide a world-class transportation system that is safe, innovative, reliable and dedicated to a prosperous Missouri.

MoDOT's Tangible Results:

- Keep Customers and Ourselves Safe
- Keep Roads and Bridges in Good Condition
- Provide Outstanding Customer Service
- Deliver Transportation Solutions of Great Value
- Operate a Reliable and Convenient Transportation System
- Use Resources Wisely
- Advance Economic Development

MoDOT's Value Statements:

- Be Safe,
 - Be Accountable,
 - Be Respectful,
 - Be Inclusive,
 - Be Bold,
 - Be Better and
 - Be One Team
- So we can be a great organization

Financial Summary Sheet

A. Total Estimated Costs	SFY 2019	Amended SFY 2018
Part I – Planning	\$19,857,390	\$20,544,195
Part II – Metropolitan Planning	\$11,177,390	\$10,078,190
Part III – Research, Development and Technology	\$2,610,811	\$2,608,883
TOTAL ESTIMATED COST	\$33,645,591	\$33,231,268
B. Available Federal Funds	SFY 2019	SFY 2018
Part I - State Planning		
Obligated but Not Spent	\$6,604,694	\$9,071,995
Unobligated Funds	\$31,754,178	\$30,391,396
Estimated Annual Apportionment	\$14,800,000	\$14,400,000
SUBTOTAL – STATE PLANNING	\$53,158,872	\$53,863,391
Part II - Metropolitan Planning		
Obligated but Not Spent	\$10,114,318	\$8,480,979
Unobligated Funds	\$12,051,824	\$5,088,526
Estimated FHWA PL Annual Allocation	\$5,400,000	\$5,300,000
Estimated FTA 5303 Annual Allocation	\$1,780,592	\$1,742,355
SUBTOTAL – METRO PLANNING	\$29,346,734	\$20,611,860
Part III – Research		
*Obligated but not spent	\$2,833,015	\$2,840,081
Unobligated Funds	\$8,699,672	\$7,247,048
Estimated Annual Apportionment	\$4,800,000	\$4,800,000
Less:	(\$1,839,146)	(\$1,869,800)
- NCHRP.....\$1,100,000 estimated		
- TRB Core.....\$176,346 estimated		
- Pooled Funds.....\$562,800 estimated		
SUBTOTAL – RESEARCH	\$14,493,541	\$13,017,329
TOTAL FEDERAL FUNDS AVAILABLE	\$96,999,147	\$87,492,580

* The majority of “Obligated but Not Spent” funds are obligated for pooled fund projects proposed project financing for SFY 2018.

C. Proposed Budget Estimates for SFY 2019

C. Proposed Budget Estimates for SFY 2019	Federal Funds	Percent	Matching Funds	Total
State Planning	\$15,885,912	80%	\$3,971,478	\$19,857,390
Metropolitan Planning (PL and 5303) (Estimated)	\$8,941,912	80%	\$2,235,478	\$11,177,390
Research	\$2,088,649	80%	\$522,162	\$2,610,811
TOTAL SP, SR & CPG	\$26,916,473		\$6,729,118	\$33,645,591

D. Amended SFY 2018 SPR Budget Amounts

D. Proposed Amended Budget Estimates for SFY 2018	Federal Funds	Percent	Matching Funds	Total
State Planning	\$16,435,356	80%	\$4,108,839	\$20,544,195
Metropolitan Planning (PL and 5303) (Estimated)	\$8,062,552	80%	\$2,015,638	\$10,078,190
Research	\$2,087,106	80%	\$521,777	\$2,608,883
TOTAL SP, SR & CPG	\$26,585,014		\$6,646,254	\$33,231,268

Itemized Cost Budget Estimates and Actual Expenditures

Part I – Planning

Transportation Planning Activities	SFY 2019 Budget	Amended SFY 2018 Budget
• Administration	\$797,033	\$1,158,168
• Planning and Performance Group		
o Planning and Policy Group	\$519,824	\$480,561
o Strategic Planning Group	\$374,197	\$430,688
• Statewide Programming	\$709,564	\$642,494
• Transportation Systems Management	\$3,396,348	\$3,451,047
o Administration	\$132,083	\$121,198
o Mapping and Customer Service	\$643,272	\$575,570
o Pavement Analysis and Application Dev.	\$693,131	\$606,776
o Traffic Collection	\$655,978	\$448,208
▪ Field Acquisition	\$744,210	\$1,214,076
o Data	\$527,674	\$485,219
SUBTOTAL	\$5,796,966	\$6,162,958
<i>District Transportation Planning</i>		
• CD	\$1,345,496	\$1,345,496
• KC	\$1,409,313	\$1,409,313
• NE	\$910,458	\$910,458
• NW	\$608,687	\$608,687
• SE	\$941,902	\$941,902
• SL	\$1,029,489	\$1,029,489
• SW	\$946,588	\$946,588
SUBTOTAL	\$7,191,933	\$7,191,933
<i>Other Activities</i>		
• Information Systems	\$3,421,641	\$3,152,143
• Regional Planning Commission	\$1,375,000	\$1,375,000
• Financial Planning & Reporting	\$1,118,523	\$1,191,184
• Bridge Division	\$177,853	\$300,774
• Design Division	\$546,874	\$546,874
• Innovative Partnerships and Alternative Funding	\$228,600	\$623,329
SUBTOTAL	\$6,868,491	\$7,189,304
TOTAL PART I	\$19,857,390	\$20,544,195

*SFY 2018 Actuals will be submitted to FHWA as an addendum September 2018.

Part II – Urban (MPO)

	Current CPG Contract Amount	Estimated FFY 2019 Local Match	Estimated Total FFY 2019 CPG Funds with Match	FFY 2018 CPG Funds with Match
Metropolitan Areas				
NW Arkansas	\$5,000	\$1,250	\$6,250	\$8,750
Kansas City	\$2,565,671	\$641,418	\$3,207,089	\$2,481,706
St. Louis	\$4,115,236	\$1,028,809	\$5,144,045	\$5,144,045
Springfield	\$818,475	\$204,619	\$1,023,094	\$943,333
Columbia	\$443,099	\$110,775	\$553,874	\$509,339
Jefferson City	\$206,563	\$51,641	\$258,204	\$175,978
Joplin	\$334,506	\$83,627	\$418,133	\$322,708
St. Joseph	\$237,666	\$59,417	\$297,083	\$222,713
Cape Girardeau	<u>\$215,696</u>	<u>\$53,924</u>	<u>\$269,620</u>	<u>\$269,620</u>
TOTAL PART II	\$8,941,912	\$2,235,478	\$11,177,390	\$10,078,190

- Note:** - The estimated total of MPO contracts (CPG agreements) in place for the SFY 2019 SPR work program is \$8,941,912.
- The estimated PL amount is before post-apportionment set-asides; before penalties; before sequestration.
 - For SFY 2019 SPR, estimated total apportioned PL Funds = \$5,489,678 and Obligation limitation applied at 91.79%.

Part III – Research – SPR

Activity	SFY 2019 Budget	Amended SFY 2018 Budget
• Administration (SPR19ADS)	\$256,313	\$254,751
• Research (SPR19RDS)	\$1,763,908	\$1,776,782
• Development (SPR19DVS)	\$93,090	\$84,350
• Technology Transfer (SPR19TTS)	<u>\$497,500</u>	<u>\$493,000</u>
TOTAL PART III	\$2,610,811	\$2,608,883

*SFY 2018 Actuals will be submitted to FHWA as an addendum September 2018.

TOTAL MoDOT SPR WORK PROGRAM

	SFY 2019 Budget	Amended SFY 2018 Budget
• Part I – Planning	\$19,857,390	\$20,544,195
• Part II – Metropolitan Planning	\$11,177,390	\$10,078,190
• Part III – Research	\$2,610,811	\$2,608,883
TOTAL MoDOT SPR WORK PROGRAM	\$33,645,591	\$33,231,268

*SFY 2018 Actuals will be submitted to FHWA as an addendum September 2018.

WORK PLANS

Core and Mandated Activities

Part I – Planning

TRANSPORTATION PLANNING ACTIVITIES

ADMINISTRATION

Purpose and Scope: Administration provides for the management of Transportation Planning's core functions. Included are items such as training, for example: NHI courses, supervisory/management training, APA training and other various training courses. Also included are such items as office supplies, equipment and travel expenses. The budget amount includes personal services and fringe benefits for employees in this unit.

This unit also includes MoDOT's participation in the Midwest Rail Initiative that involves sharing of information regarding freight and passenger movements on rail and freight data update coordination and economic studies.

SFY 2019 Proposed Activities:

- Continue providing for the management of Transportation Planning's core functions including trainings and office supplies, equipment and travel expenses
- Host a statewide planning partner meeting early 2019 to share transportation information and best practices
- Continue participating in the Midwest Rail Initiative
- Attend conferences, peer exchanges, AASHTO meetings and training courses
- Conduct an economic impact analysis for the SFY 2019-2023 STIP

SFY 2018 Accomplishments:

- Hosted one planning partner meeting, February 8, 2018, and shared information regarding transportation funding, planning for the next Statewide Transportation Improvement Program and asset management planning by regional group
- Attended conferences, peer exchanges, AASHTO meetings and training courses
- Conducted an economic impact analysis for the SFY 2018-2022 STIP
- Updated the Long Range Transportation Plan

Financials

Projected Budget SFY 2019

Amount

\$ 797,033

Work ID Code

SPR1940S

Amended Budget Amount SFY 2018 \$ 1,158,168

SPR1840S

Actual Cost SFY 2018 (See Addendum Sept. 2018)

SPR1840S

PLANNING AND PERFORMANCE GROUP

Purpose and Scope: Planning and Performance Group (PPG) includes both the Planning and Policy and Strategic Planning Groups. These two groups have been consolidated into one unit and will continue working on current goals and accomplishments assigned to each group. The budgets and actuals will be tracked separately for each group. The budget amounts include personal services and fringe benefits for employees in these units.

Planning and Policy: PPG maintains the 20-year long-range transportation plan. This plan analyzes needs for all modes of transportation and provides policy and goal direction for MoDOT as it develops the Statewide Transportation Improvement Program. This unit also covers a wide variety of activities and ensures MoDOT's program delivery moves as seamless as possible.

Strategic Planning Group: MoDOT aligns the strategic planning process with its mission, values and tangible results. The tangible results focuses on outcomes that MoDOT's customers expect the department to accomplish. MoDOT uses strategic management to ensure this is an ongoing process rather than an annual event. By linking performance measures to its tangible results, related strategies and objectives are identified, and action plans for the priority items are created. These action plans are continuously reviewed and modified, as necessary, throughout the year. Quarterly management review of the performance management system known as the Tracker ensures accountability at all levels. Annual leadership focus meetings establish high-level department direction and initiatives that help drive performance in key areas. The budget amount includes personal services and fringe benefits for employees coordinating and facilitating these efforts.

SFY 2019 Proposed Activities:

Planning and Policy Group:

- Attend MPOs board and technical committee meetings
- Engage the public in discussions about additional transportation investments and needs
- Continue assisting RPCs in:
 - developing and maintaining work programs and regional transportation plans
 - providing local consultation with rural local officials
- Continue assisting MPOs in developing and maintaining the following work products
 - unified planning work programs
 - transportation improvement programs
 - long-range transportation plans
 - air quality conformity determinations
 - public involvement plans
- Work with local communities to assist with transportation air-quality issues and policy development
- Coordinate and support MoDOT's national involvement in FAST Act/MAP-21 performance measure development and implementation
- Continue monthly FAST Act/MAP-21 implementation calls with MPOs, RPCs, ONE DOT, Arkansas, Illinois, and Kansas DOT, FHWA and FTA staff to collaborate on performance management requirements and share best practices
- Assist MPOs in Performance Based Planning and Programming
- Administer Tracker surveys: Customer Service Survey (Call Center)
- Participate in the ONE DOT Federal Certification Review of the transportation planning process in the Southeast Missouri (SEMPO) metropolitan planning area
- Continue to improve the Transportation Asset Management Plan that is federally required
- Continue to update the district Transportation Asset Management Plan

- Update the FY 2019 State Planning and Research Work Program

SFY 2019 Proposed Activities:

Strategic Planning Group:

- Provide team facilitation for process improvement and business planning teams
- Continue to support and develop the Tracker performance management system
- Continue to refine MoDOT's performance scorecard
- Provide guidance and reviews of performance measures to MoDOT management
- Produce the quarterly Tracker publications and coordinate quarterly Tracker Review meetings
- Coordinate "deep-dive" sessions and Focal Point publications
- Coordinate strategic issue sessions for senior manager meetings
- Continue to coordinate and develop the Innovations Challenge program
- Develop online tools for process improvement, business planning and performance measurement
- Conduct Transportation Planning Division's internal and external customer satisfaction surveys
- Revise the public involvement elements of the Engineering Policy Guide

SFY 2018 Accomplishments:

Planning and Policy Group:

- Assisted the RPCs with:
 - developing and maintaining work programs and regional transportation plans and
 - providing local consultation with rural local officials
- Attended MPOs board and technical committee meetings
- Continued collaborating with RPCs and MPOs and MoDOT district offices on a variety of planning issues targeted at improving federal required work products and to further enhance transportation planning efforts
- Collaborated with local communities to assist with transportation air-quality issues and policy development
- Coordinated and supported MoDOT's national involvement in FAST Act/MAP-21 performance measure development and implementation
- Initiated monthly FAST Act/MAP-21 implementation calls with MPOs, RPCs, ONE DOT, Arkansas, Illinois, and Kansas DOT, FHWA and FTA staff to collaborate on performance management requirements and share best practices
- Assisted MPOs in developing performance measures and targets
- Developed the Transportation Asset Management Plan that is federally required
- Administered Tracker surveys: Customer Service Survey (Call Center)
- Conducted and managed Report Card Survey (customer satisfaction survey of Missourians)
- Participated in the ONE DOT Federal Certification Review of the transportation planning process in the St. Louis and Kansas City metropolitan planning areas
- Participated in the ONE DOT Planning process/program review of the Columbia metropolitan planning area
- Worked with districts on Transportation Asset Management Plan
- Updated and submitted FY 2018 State Planning and Research Work Program
- Updated Regional Planning Commission Contracts
- Updated Missouri's Long Range Transportation Plan
- Participated in FHWA Listening Sessions with MPOs
- Revised the public involvement element of the Engineer Policy Guide

SFY 2018 Accomplishments:**Strategic Planning Group:**

- Supported and developed the Tracker performance management system including the production of the quarterly Tracker publications and coordination of the quarterly Tracker Review meetings
- Provided guidance and reviews of performance measures to MoDOT management
- Completed the target setting process for all appropriate Tracker measures
- Deployed a performance management scorecard
- Deployed action plans for all Focal Point sessions
- Facilitated the Comprehensive Fleet and Equipment Plan Team, which evaluated the processes and decision criteria for distributing, maintain and replacing fleet and equipment statewide
- Facilitated the Program Delivery Vision Team, which developed short-term and long-term strategies to deliver a larger program with current staffing
- Updated online best practices pages for internal and external audiences
- Coordinated and further developed the Innovations Challenge program
- Provided guidance to other DOTs interested in starting their own innovations programs
- Identified 56 best practices in the Innovations Challenge program, which have been shared for statewide implementation

<u>Financials</u>	<u>Amount</u>	<u>Work ID Code</u>
<u>Planning and Policy Group</u>		
Projected Budget SFY 2019	\$519,824	SPR1940S
Amended Budget Amount SFY 2018	\$480,561	SPR1840S
Actual Cost SFY 2018	(See Addendum Sept. 2018)	SPR1840S
<u>Strategic Planning Group</u>		
Projected Budget SFY 2019	\$374,197	SPR1940S
Amended Budget Amount SFY 2018	\$430,688	SPR1890S
Actual Cost SFY 2018	(See Addendum Sept. 2018)	SPR1890S

STATEWIDE PROGRAMMING

Purpose and Scope: The Statewide Programming unit develops the STIP and STIP-related products. This includes efforts by MoDOT Central Office personnel only. Personal services and fringe benefits for all employees within this work unit are also included in the budget amount.

SFY 2019 Proposed Activities:

- Produce and maintain the 2019-2023 STIP in accordance with the guidelines of the Planning Framework and state and federal regulations
- Produce various reports on STIP programs and projects as needed

SFY 2018 Accomplishments:

- Updated and completed the 2018-2022 STIP
- Incorporated STIP revisions as needed
- Developed STIP reports as needed
- Completed portions of the annual accountability report
- Posted Program vs. Award and AC conversion reports on the STIP web site

<u>Financials</u>	<u>Amount</u>	<u>Work ID Code</u>
Projected Budget SFY 2019	\$ 709,564	SPR1940S
Amended Budget Amount SFY 2018	\$642,494	SPR1840S
Actual Cost SFY 2018	(See Addendum Sept. 2018)	SPR1840S

TRANSPORTATION SYSTEM ANALYSIS

ADMINISTRATION

Purpose and Scope: Transportation Planning's administration manages and administers field acquisition, asset data, traffic data, travel way data, analysis of asset/travel way, data query and traffic operations. The budget amount also includes personal services and fringe benefits for all employees within this work unit.

SFY 2019 Proposed Activities:

- Administer and continue to improve the HPMS program
- Analyze transportation data and provide timely and accurate information to MoDOT's customers
- Continue to provide data for the development of the MoDOT Asset Management Plan
- Administer and continue the Data Zone project

SFY 2018 Accomplishments:

- Administered HPMS program
- Analyzed and provided transportation data to customers and transportation decision makers
- Coordinated the Data Zone project
- Provided data for the development of the MoDOT Asset Management Plan

<u>Financials</u>	<u>Amount</u>	<u>Work ID Code</u>
Projected Budget SFY 2019	\$132,083	SPR1940S
Amended Budget Amount SFY 2018	\$121,198	SPR1840S
Actual Cost SFY 2018	(See Addendum Sept. 2018)	SPR1840S

MAPPING and CUSTOMER SERVICE

Purpose and Scope: The Mapping and Customer Service unit is responsible for the following. The budget amount includes personal services and fringe benefits for all employees within this work unit.

- Provide analysis, custom queries and reports using TMS data
- Provide training and documentation for TMS and customer support through our TMS Help Desk
- Test TMS software for monthly updates
- Maintain and publish the official Missouri State Highway Map
- Maintain statewide functional classification maps
- Maintain and update state, county, and city maps and develop specialty maps as requested
- Provide GIS data and support as requested
- Provide official state system and county road mileages
- Respond to custom mileage requests

- Work with all Missouri counties to update their county road mileages in TMS
- Provide outstanding customer service both inside and outside the department
- Work with Information Systems to gather business requirements for TMS Design

SFY 2019 Proposed Activities:

- Continue updating, printing and providing distribution support of the official Missouri State Highway Map
- Provide GIS data and mapping support to SEMA/FEMA during declared disasters in Missouri
- Provide custom GIS data and specialty maps to internal/external customers and planning partners
- Create county maps for internal and external customers
- Create annual STIP maps, traffic volume map, ACPA van trip map booklet, and bridge and culvert inspection maps
- Update functional classification maps as required
- Provide MoDOT representation on Missouri GIS Advisory Council, Missouri Board on Geographic Names, AASHTO's GIS for Transportation, MidAmerica GIS Consortium, Missouri Geographic Alliance, Missouri Mappers Association, USGS National Map Corps, and the Statewide Incident Response Plan Team
- Provide GIS representation on the NCHRP Roadside Monarch Habitat Project
- Provide representation on the state Innovations Challenge Team and submit a (statewide) best practice in the competition
- Provide continued oversight to the Missouri statewide high-resolution imagery program (Ortho-Imagery Program) with the Missouri Office of Administration
- Conduct monthly TMS application update testing, provide support and TMS data restoration as required by our route update process
- Create and submit annual mileage of county roads by surface type report to the Missouri Department of Revenue and annual certified mileage report to the Governor and FHWA for approval
- Create annual official state system mileage report and various TMS mileage reports for internal and external customers
- Create county map books used by county commissioners to approve their official mileage that determines CART funding
- Research TMS crash location inquiries submitted by law enforcement
- Identify construction projects that opened to traffic
- Maintain Mapping and Customer Service SharePoint page and continue conversion of TMS documentation into SharePoint
- Set up security for TMS applications (STARTS, background checks, etc.)
- Conduct annual statewide GIS workshop for RPC and MPO partners
- Test reports and correspondence for the Crystal Reports upgrade
- Test TMS Modernization, create manuals and provide training
- Test new and existing Data Zone applications and create/update manuals and videos as needed
- Create videos for TMS training
- Continue updating TMS Metadata in SharePoint for tables, views and code tables
- Provide ArcGIS software testing support for the 10.6.1/Oracle 12C upgrade
- Provide ongoing GIS data exchange with Missouri's surrounding states
- Participate in GIS Day through education outreach at elementary schools
- Provide ongoing legislative support regarding transportation funding
- Provide outstanding customer service both inside and outside the department

SFY 2018 Accomplishments:

- Completed testing for the Flasher, Adobe and Internet Explorer updates
- Completed Windows 10 testing
- Tested reports and correspondence for the Crystal Reports upgrade
- Tested TMS Modernization rewrite and updates
- Tested new Data Zone applications and created manuals and videos
- Created and updated training documentation for TMS Maps, Flood Conditions, Traffic Impact, Winter Road Conditions, Traffic Segment Hourly Volume, Striping Template, Striping Plan, Striping Actuals, Bypass Editor, Traffic Impact Bypass, Realty Asset Management, Right of Way Parcel Acquisition, Travelway Maintenance Agreements Map, Alias, Crash Prediction Tool, Crash Map Tool, Maintenance Agreement, Guardrail, Guard Ends and Runs, Average AADT Map, and ARAN Viewer
- Provided training on TMS applications via video conference and classroom atmosphere
- Provided GIS training for RPC and MPO partners
- Provided training for Chief Counsel's Office on the Crash Browser, ARAN and Crash Statistics Map
- Conducted monthly TMS application update testing, provided support and TMS data restoration
- Provided support to the Missouri Division of Tourism for the 2017 Total Solar Eclipse Map
- Provided ongoing GIS data exchange with Missouri's surrounding states
- Provided custom GIS data and specialty maps to internal/external customers and planning partners
- Created county map books, annual STIP maps, traffic volume map, ACPA van trip map booklet, and bridge and culvert inspection maps
- Updated functional classification maps
- Continued distribution support of the official 2017-2018 Missouri State Highway Map and created the second edition of the 2017-2018 state map
- Provided MoDOT representation on Missouri GIS Advisory Council, Missouri Board on Geographic Names, AASHTO's GIS for Transportation, MidAmerica GIS Consortium, Missouri Geographic Alliance, Missouri Mappers Association, USGS National Map Corps, Statewide Incident Response Plan Team, and Missouri Geographic Bee 2018
- Provided GIS representation on the NCHRP Roadside Monarch Habitat Project
- Provided representation to the Missouri statewide high-resolution imagery program (Ortho-Imagery Program) with the Missouri Office of Administration
- Provided representation on the state Innovations Challenge Team and submitted a winning (statewide) best practice in the competition
- Provided representation on the Statewide Incident Response Team
- Submitted annual mileage of county roads by surface type report to the Missouri Department of Revenue and annual certified mileage report to the Governor and FHWA for approval
- Created annual official state system mileage report and various TMS mileage reports for internal and external customers
- Researched TMS location inquiries submitted by law enforcement
- Identified construction projects that opened to traffic
- Updated TMS Metadata in SharePoint for tables, views and code tables
- Migrated Cognos reports to Crystal reports for Safety and Bridge
- Provided ongoing legislative support regarding transportation funding
- Set up security for all TMS applications (STARTS, background checks, etc.)
- Provided outstanding customer service both inside and outside the department

<u>Financials</u>	<u>Amount</u>	<u>Work ID Code</u>
Projected Budget SFY 2019	\$643,272	SPR1940S
Amended Budget Amount SFY 2018	\$575,570	SPR1840S
Actual Cost SFY 2018	(See Addendum Sept. 2018)	SPR1840S

PAVEMENT ANALYSIS AND APPLICATION DEVELOPMENT

Purpose and Scope: The Pavement Analysis and Application Development unit provides analysis of pavement data used in project selection and prioritization process as well as track conditions for strategic and long-range plans, and compiling and submitting all HPMS data as required by FHWA. This also includes personal services and fringe benefits for all employees within this work unit.

SFY 2019 Proposed Activities:

- Evaluate pavement data and prepare for HPMS submittal
- Provide pavement data, analysis and projections for transportation decision-making
- Enhance and refine pavement management systems automated distress recognition and reporting
- Verify, maintain, and update MoDOT's linear referencing system for all public roads
- Create new LRS data type for 'inventories' that are not located on roadways
- Prepare and redesign GIS/LRS applications for upgraded GIS software platform
- Automate more processes/systems for the enhanced pavement data collection equipment
- Monitor pavement data to evaluate current and past best practices in pavement management

SFY 2018 Accomplishments:

- Completed pavement data analysis and preparation for dual carriage routes for HPMS submittal
- Continued development of data zone applications
- Provided analysis and input for MoDOT's asset management plan
- Enhanced pavement management system for new FAST Act/MAP-21 pavement reporting requirements
- Maintained MoDOT's linear referencing system and continually worked with counties to verify local roads
- Created an LRS routing network for automated routing of Superloads
- Continued working with law enforcement agencies to ensure proper location of crash data on MoDOT's LRS
- Added additional quality control checks to pavement data ensuring data integrity
- Added new asset inventories into the modernized LRS

<u>Financials</u>	<u>Amount</u>	<u>Work ID Code</u>
Projected Budget SFY 2019	\$693,131	SPR1940S
Amended Budget Amount SFY 2018	\$606,776	SPR1840S
Actual Cost SFY 2018	(See Addendum Sept. 2018)	SPR1840S

TRAFFIC/COLLECTION

Purpose and Scope: The Traffic/Collection unit provides current traffic data, design traffic projections, road-user costs analysis, VMT and annual reports. This unit provides the department and external customers with current and historical traffic information, traffic trends and VMT, and cooperates with the MPOs and other local entities in providing off-system traffic information and VMT for MoDOT and HPMS use. The budget amount also includes personal services and fringe benefits for all employees within this work unit.

SFY 2019 Proposed Activities:

- Provide traffic and pavement data for planning and design activities
- Calculate and provide 2018 statewide travel data

SFY 2018 Accomplishments:

- Processed portable and permanent counts in accordance with the traffic monitoring guide for HPMS submittal
- Calculated and provided 2017 statewide travel data and reports
- Collected pavement data on 30,380 miles of Missouri's roadways

<u>Financials</u>	<u>Amount</u>	<u>Work ID Code</u>
Projected Budget SFY 2019	\$655,978	SPR1940S
Amended Budget Amount SFY 2018	\$448,208	SPR1840S
Actual Cost SFY 2018	(See Addendum Sept. 2018)	SPR1840S

Field Acquisition

Purpose and Scope: The Field Acquisition unit is responsible for collecting condition and operational data for the state highway system, processing and verifying physical roadway data and analyzing and reporting information on pavements. This includes personal services and fringe benefits.

- Traffic data (permanent count locations and special requests) and portable traffic counts, including vehicle classification and speed data
- Manual turning movement counts
- WIM data
- HPMS data collection
- Pavement condition data collection, processing and rating - ARAN van
- Condition reports for pavements
- Friction testing
- ARAN video

SFY 2019 Proposed Activities:

- Complete collection of approximately 6,174 portable counts and classification counts as requested with at least 30 percent of those counts being classification counts
- Install and repair ATR sites as needed due to new pavement or faulty sensors in the pavement
- Maintain our ATR sites with at least 95 percent cellular modem connection
- Collect HPMS data as requested
- Collect as much of the 35,000 miles of pavement data

SFY 2018 Accomplishments:

- Collected 5,641 portable counts and class counts with 59 percent of those being classification counts
- Installed and repaired existing ATR sites
- Continued maintaining cellular modem communications to our ATR sites, currently at 95 percent switchover
- Collected all HPMS data as requested
- Collected all pavement data as requested

<u>Financials</u>	<u>Amount</u>	<u>Work ID Code</u>
Projected Budget SFY 2019	\$744,210	SPR1940S
Amended Budget Amount		
SFY 2018	\$1,214,076	SPR1841S
Actual Cost SFY 2018	(See Addendum Sept. 2018)	SPR1841S

DATA

Purpose and Scope: The Data section maintains the system data associated with the state highway network. The budget amount also includes personal services and fringe benefits for all employees within this work unit.

- Change in route status
- Functional classification
- HPMS data
- Rural and urban area functional classification maps
- Bridge vertical clearance data
- State system classification
- National Highway System (NHS)
- Physical inventory of lane data (project location and length, number of lanes, pavement type, widths, thickness)
- Inventory of various data types (i.e., outdoor advertising controlled routes, truck routes, auto issue routes)

SFY 2019 Proposed Activities:

- Maintain all HPMS sample and universe segments
- Verify HPMS data accuracy and meet target submittal date to FHWA
- Maintain roadway data and its attributes
- Update bridge vertical clearances
- Maintain various TMS data types and update data as required by TP's route update process
- Process functional classification requests and changes
- Improve data accuracy by querying data to locate inconsistencies
- Respond to requests for relocating bridges and other customer service requests
- Supply data to create various maps
- Provide data for automated Motor Carrier routing
- Assist with testing and implementation of new Motor Carrier application that supports safe, efficient, and timely movement of freight through Missouri
- Continue improving the Change in Route Status Reports filing process and the process to expedite data retrieval

- Maintain an inventory of Federal Aid Primary as of 1991 for various legal purposes related to the management of Outdoor Advertising
- Update applications and maps to improve the Outdoor Advertising data maintenance process
- Maintain striping data and its attributes
- Review county map books for ownership and accuracy
- Collaborate with FHWA with transportation data regarding urban boundaries
- Work with FHWA to achieve approval of new urban boundaries
- Collect, manage, and report data on all public roads in an effort to support the strategic and performance-based goals in the SHSP and HSIP

SFY 2018 Accomplishments:

- Maintained all HPMS sample and universe segments and submitted the data to FHWA
- Maintained an inventory of roadway lane data and its attributes
- Entered approximately 300 roadway projects into TMS
- Assisted with testing and implementing an inventory of striping
- Updated bridge vertical clearances and answered bridge and clearance related questions
- Maintained various TMS data types and updated data as required by TP's route update process
- Processed standard functional classification requests and changes
- Researched and answered inquiries submitted by internal customers (i.e., ownership)
- Provided GIS section with modifications to MoDOT's route network
- Updated MoDOT performance measures to provide management with information on roadway projects
- Served as a liaison between Motor Carrier Services and TP concerning routing and junction issues
- Assisted with testing the TMS Modernization applications for associatives
- Coordinated the FAST Act/MAP-21 enhanced NHS/Principal Arterial route review with districts
- Updated NHS data upon approval from FHWA and completed NHS changes as a result of the STL district NHS/Principal Arterial reviews
- Processed Change in Route Status Reports
- Assisted with development of new Motor Carrier application that supports safe, efficient, and timely movement of freight through Missouri
- Researched and determined road sections utilizing plans, deeds and history maps
- Provided technical assistance with database issues pertaining to bridge inventory
- Conducted a statewide review of roadway detail and speed limit data
- Provided Billboard and Junkyard maps to customers as requested
- Reviewed county map books and assigned ownership
- Combined data records as requested using a data rollup program
- Collaborated with FHWA with transportation data regarding urban boundaries
- Completed entry of data for new TMS associative application and map for Federal Aid Primary-1991

Financials

	<u>Amount</u>	<u>Work ID Code</u>
Projected Budget SFY 2019	\$527,674	SPR1940S
Amended Budget Amount SFY 2018	\$485,219	SPR1840S
Actual Cost SFY 2018	(See Addendum Sept. 2018)	SPR1840S

DISTRICT TRANSPORTATION PLANNING

This program supports the department's district planning staff in efforts to provide comprehensive, cooperative and continuing transportation planning assistance and direction to the district staff, MPOs and RPCs. It includes the district staff efforts and activities with the MPOs, RPCs, local government officials and federal transportation agencies that support the long-range planning process and programming of transportation needs and pre-scoping activities.

<i>District Transportation Planning</i>	<i>SFY 2019 Budget</i>	<i>Amended SFY 2018 Budget</i>
• CD	\$1,345,496	\$1,345,496
• KC	\$1,409,313	\$1,409,313
• NE	\$910,458	\$910,458
• NW	\$608,687	\$608,687
• SE	\$941,902	\$941,902
• SL	\$1,029,489	\$1,029,489
• SW	\$946,588	\$946,588
SUBTOTAL	\$7,191,933	\$7,191,933

*SFY 2018 Actuals will be submitted in the September 2018 Addendum.

OTHER ACTIVITIES**INFORMATION SYSTEMS**

Purpose and Scope: MoDOT is directing a portion of the SPR funds for support, maintenance and modernization of the Transportation Management System.

SFY 2019 Proposed Activities:

- Maintain and modernize the Transportation Management System

SFY 2018 Accomplishments:

- TMS Core Maintenance Support, including repair, maintenance, and fix of current system, including the following key areas of TMS that provide critical support to MoDOT users and customers: Bridge, Adopt A Highway, Outdoor Advertising, Statewide Transportation Improvement Program, Traffic & Congestion, Pavement Tools, Intelligent Transportation System and Safety System.

Financials

Projected Budget SFY 2019

Amount

\$3,421,641

Work ID Code

SPR19ISS

Amended Budget Amount SFY 2018

\$3,152,143

SPR18ISS

Actual Cost SFY 2018

(See Addendum Sept. 2018)

SPR18ISS

REGIONAL PLANNING COMMISSIONS

Purpose and Scope: MoDOT is directing a portion of the SPR funds to regional planning agencies for transportation planning activities. These funds provide sources of funding for the Missouri RPC to carry out comprehensive and continuing transportation planning processes in cooperation with state and local planning partners. State Planning and Research funds that are allocated to RPCs assist with producing regional transportation plans, work programs involving transportation planning activities, citizen involvement processes, and other rural transportation planning efforts. Seventeen RPCs will receive federal SPR funding at approximately \$65,000 each. Budget and actual amounts exclude local match.

SFY 2019 Proposed Activities:

- Cooperate and collaborate with MoDOT on transportation planning processes
- Attend MACOG meetings held monthly in Jefferson City to discuss various issues with RPCs
- Participate in RPCs' transportation advisory committee meetings held in the respective regions throughout the state
- RPCs work with MoDOT and districts with developing work programs involving transportation planning activities
- Attend MoDOT District meetings
- Participate in Blueprint for Safety
- Participate in FAST Act/ MAP-21 conference calls

SFY 2018 Accomplishments:

- Attended MACOG meetings held monthly in Jefferson City to discuss various issues with RPCs
- Participated in RPCs technical committee meetings held in the respective regions throughout the state
- Worked with RPCs and districts with developing work programs involving transportation planning activities
- Attended MoDOT District meetings
- Participated in Blueprint for Safety
- Attended Statewide Planning Partner meetings hosted by MoDOT, February 8, 2018

<u>Financials</u>	<u>Amount</u>	<u>Work ID Code</u>
Projected Budget SFY 2019	\$1,375,000	SPR1927S
Budget Amount SFY 2018	\$1,375,000	SPR1827S
Actual Cost SFY 2018	(See Addendum Sept. 2018)	SPR1827S

FINANCIAL PLANNING AND REPORTING

Purpose and Scope: These activities support MoDOT's budget, finance, funds management and infrastructure bank activities. In addition, funds will be managed to achieve a balanced budget and provide coordination of STIP and federal-aid projects. Financial models are prepared to support department long-term plans and short-term cash needs. In addition, the Financial Service staff will continue to provide information on innovative sources of funding for the department's transportation projects. The budget amount also includes personal services and fringe benefits for employees within this work unit.

SFY 2019 Proposed Activities:

- Provide support for MoDOT's budget, finance, funds management and infrastructure bank

SFY 2018 Accomplishments:

- Provided activities to support MoDOT's budget, finance, funds management and infrastructure bank activities

<u>Financials</u>	<u>Amount</u>	<u>Work ID Code</u>
Projected Budget SFY 2019	\$1,118,523	SPR1993S
Amended Budget Amount SFY 2018	\$1,191,184	SPR1893S
Actual Cost SFY 2018	(See Addendum Sept. 2018)	SPR1893S

BRIDGE DIVISION

Purpose and Scope: MoDOT is directing a portion of the SPR funds for Bridge Division staff spending all or a portion of their time working on projects prior to them being included in the STIP.

SFY 2019 Proposed Activities:

- Prepare projects to be included in the STIP

SFY 2018 Accomplishments:

- Prepared projects to be included in the STIP

<u>Financials</u>	<u>Amount</u>	<u>Work ID Code</u>
Projected Budget SFY 2019	\$177,853	SPR19BRS
Amended Budget Amount SFY 2018	\$300,774	SPR18BRS
Actual Cost SFY 2018	(See Addendum Sept. 2018)	SPR18BRS

DESIGN DIVISION

Purpose and Scope: MoDOT is directing a portion of the SPR funds for Design Division staff spending all or a portion of their time working on projects prior to them being included in the STIP.

SFY 2019 Proposed Activities;

- Prepare projects to be included in the STIP

SFY 2018 Accomplishments:

- Prepared projects to be included in the STIP

<u>Financials</u>	<u>Amount</u>	<u>Work ID Code</u>
Projected Budget SFY 2019	\$546,874	SPR1995S
Amended Budget Amount SFY 2018	\$546,874	SPR1895S
Actual Cost SFY 2018	(See Addendum Sept. 2018)	SPR1895S

INNOVATIVE PARTNERSHIPS AND ALTERNATIVE FUNDING

Purpose and Scope: The Division will develop programs as an adjunct arm of the Director's Office on issues and projects. Programs are largely focused upon alternative revenue strategies and technological innovation in the vehicle communication technology and autonomous vehicles sectors.

SFY 19 Proposed Activities:

- Administration of Surface Transportation Systems Funding Alternative (STSFA) Program
- Deployment of various experimental vehicle communication technologies
- Assessment of various FHWA and USDOT credit assistance tools for initiation in Missouri
- Development of policy initiatives for the Director's office for review by state government stakeholders
- Advising on preparation of various discretionary grant applications to USDOT and FHWA

SFY 18 Accomplishments:

- Administered the Surface Transportation Systems Funding Alternative (STSFA) Program
- Developed a financial model for the STSFA using pre-deployment funds to test feasibility for MPG vehicle registration
- Filed enabling legislation to change vehicle registration from taxable horse power to MPG
- Awarded \$2.7 million STSFA competitive federal grant to continue with full deployment of MPG vehicle registration initiative
- Presented at and participated in multiple conferences both in Missouri and around the country to disseminate information about the Innovative Partnership division at MoDOT and learn what other states are doing in similar positions
- Developed 11 strategic initiatives for the *Sharpening Our Strategic Vision* program and began sharing the "placemat" outlining the three themes of Safety, Service and Stability

Financials

	<u>Amount</u>	<u>Work ID Code</u>
Projected Budget SFY 2019	\$228,600	SPR19IPS
Amended Budget Amount SFY 2018	\$623,291	SPR18IPS
Actual Cost SFY 2018	(See Addendum Sept. 2018)	SPR18IPS

Part II – Urban Transportation Planning

TRANSPORTATION PLANNING IN METROPOLITAN AREAS – CONSOLIDATED PLANNING GRANT (CPG)

The U.S Department of Transportation's Consolidated Planning Grant Program (CPG) allows the States and Metropolitan Planning Organizations (MPOs) to merge FTA metropolitan or statewide planning funds with FHWA Planning (PL) funds to provide States support for both highway and transit planning activities to single consolidated grants. This CPG program fosters a cooperative effort between the Federal agencies and the participating States to streamline the delivery of their planning programs providing the flexibility in the use of planning funds. Beginning July 1, 2003, MoDOT elected to have FHWA PL Funds and FTA Section 5303 Metropolitan Transportation Planning Funds consolidated. As of June 2016, the designated lead agency for administering the CPG funds was changed from FTA to FHWA.

CPG funds provide the principal source of funding for Missouri MPOs to carry out a comprehensive and continuing transportation planning process in cooperation with local, state and federal transportation agencies. This process is a prerequisite for receiving federal-aid funding for transportation improvements in metropolitan areas. FAST Act reaffirmed the leading role of the MPO in the transportation improvement decision-making process, particularly in the large urbanized areas of more than 200,000 populations.

CPG funds, which are all allocated to MPOs, assist MPOs with producing long-range multimodal transportation plans, transportation improvement programs, planning work programs, studies, citizen involvement processes and other urban transportation planning requirements and goals

Under CPG, the FTA and FHWA continue to distribute metropolitan planning and Statewide planning funds according to each agency's statutory formulas that the MoDOT distributes to MPOs by formulas that meet the legislative factors for each category of funds in 23 U.S.C. 104(f)(4) and 49 U.S.C. 5305(d)(2). MoDOT's distribution formula has been developed in consultation with the MPOs, and approved by FTA and FHWA for their respective programs.

The following chart shows the estimated amount of CPG funds (FHWA PL and FTA Section 5303) available for Missouri's MPOs to carry out the metropolitan transportation planning work activities to be budgeted for in each MPOs annual Unified Planning Work Program (UPWP). The MPOs will include the below listed CPG amounts or similar amounts in their UPWPs to complete activities necessary to carry out metropolitan transportation planning. Each MPO UPWP is approved by the MPO Policy Board and the FHWA/FTA (ONEDOT). Planning grant agreements based on approved UPWPs are executed between the MPOs and MoDOT to allow the pass through of Federal planning funds and 5303 Transit funds to the MPOs. SFY 2019 5303 allocation amount used 2010 census urbanized area populations.

Table 1: Total CPG Funds Available to MPOs for SFY 2019 UPWP Work Activities

Metropolitan Areas (Fiscal Year)	MPO Balances as of May 2018 (with FY 2018 allocation)	Estimated FFY19 PL Allocation	Estimated FFY19 5303 Allocation Amounts	Estimated Total CPG Funds	Current CPG Contract Amount
NW Arkansas 07/01 -06/03	\$0	\$5,000	\$0	\$5,000	\$5,000
Kansas City 01/01 - 12/31	\$3,565,171	\$1,389,145	\$494,256	\$5,448,572	\$2,565,671
St. Louis 07/01 - 06/30	\$10,231,500	\$2,446,650	\$933,798	\$13,611,948	\$4,115,236
Springfield 07/01 - 06/30	\$1,103,992	\$445,910	\$143,774	\$1,693,676	\$818,475
Columbia 10/01 - 09/30	\$693,070	\$207,646	\$65,524	\$966,240	\$443,099
Jefferson City 11/01 - 10/31	\$487,459	\$123,969	\$30,745	\$642,173	\$206,563
Joplin 11/01 - 12/31	\$1,098,962	\$154,604	\$43,478	\$1,297,044	\$334,506
St. Joseph 01/01 - 12/31	\$706,675	\$149,591	\$41,394	\$897,660	\$237,666
Cape Girardeau 07/01 - 6/30	\$618,020	\$116,460	\$27,624	\$762,104	\$215,696
TOTAL PART II	\$18,504,849	\$5,038,975	\$1,780,593	\$25,324,417	\$8,941,912

* The MPO balance is adjusted to include the actual SFY 2018 CPG allocation and equals the unobligated prior year (SFY2018 and older) CPG allocated amounts. The MPO balance column updates with payments of invoices and the allocation of CPG funds. The balance reported is a snapshot for the SPR work program update. The estimated total of MPO contracts (CPG agreements) that will be in place for the SFY 2019 SPR work program is \$8,941,912.

MPOs annually program consolidated federal planning fund amounts in approved UPWPs to complete activities necessary to implement the metropolitan transportation planning process. MPO UPWPs identify the available amounts of FHWA PL and FTA Section 5303 funds separately as funding sources but are not requested to identify SFY the separate amounts on each work activity or in the financial summary. Each MPO UPWP is approved by the MPO Policy Board and the FHWA/FTA (ONE DOT). CPG agreements, based on approved UPWPs, are executed between the MPOs and MoDOT to allow the pass through of Federal planning funds to the MPOs. MPOs have up to five years to spend CPG balances.

MoDOT allows MARC, OTO and EWG (Kansas City, Springfield and St. Louis, respectively) to use the value of MoDOT's state-funded only metropolitan planning activities to leverage the CPG funds (FHWA PL and FTA Section 5303). These MoDOT District planning activities include data collection, data analysis and data sharing that supports and enhances the overall planning process within each metropolitan planning area. Activities include such work items as traffic counts, signal timing, analysis of planning and/or traffic studies and analysis of traffic volumes and safety concerns. These work items support a more informed, better decision-making process for the MPO and can be demonstrated to be directly attributable to the MPOs planning work elements. MPOs are able to utilize

80 percent of the value of MoDOT eligible metropolitan planning work as a credit to help provide the MPOs required 20 percent match for the Federal planning funds.

The estimated values of the MoDOT state-funded metropolitan planning work activities based on the most current completed fiscal year are as follows:

Kansas City MPO	\$317,748
St. Louis MPO	\$257,686
Springfield MPO	\$150,000

Part III – Research

ADMINISTRATION

Purpose and Scope: Provide general administration funds for the development and monitoring of research programs that benefit the Missouri Department of Transportation. This includes distributing available information concerning past, current and proposed research work related to highways and transportation to supporting agencies; evaluation and development of proposed research studies; and, implementation and dissemination of research results.

<u>Financials</u>	<u>Amount</u>	<u>Work ID Code</u>
Projected Budget SFY 2019	\$256,313	SPR19ADS
Amended Budget Amount SFY 2018	\$254,751	SPR18ADS
Actual Cost SFY 2018	(See Addendum Sept. 2018)	SPR18ADS

RESEARCH

Purpose and Scope: Research at MoDOT primarily expands and advances our knowledge in all areas of transportation, so we may provide the best, total-transportation system for Missourians. The research program responds to our customer needs, provides information and technology for management policy decisions and undertakes research and development issues that have high possibilities of being implemented. It also includes contingency funds for contract research studies approved after the start of the fiscal year.

<u>Financials</u>	<u>Amount</u>	<u>Work ID Code</u>
Projected Budget SFY 2019	\$1,763,908	SPR19RDS
Amended Budget Amount SFY 2018	\$1,776,782	SPR18RDS
Actual Cost SFY 2018	(See Addendum Sept. 2018)	SPR18RDS

DEVELOPMENT

Purpose and Scope: Development studies find and implement products that have the most positive effect on MoDOT's operations. Development takes a product, process or method produced as a result of research and evaluates it for eventual implementation. Implementation applies the research, best practices and new product results within the department. The development and implementation process provides cost savings in material or time, safety issues or improved life-cycle costs.

<u>Financials</u>	<u>Amount</u>	<u>Work ID Code</u>
Projected Budget SFY 2019	\$93,090	SPR19DVS
Amended Budget Amount SFY 2018	\$84,350	SPR18DVS
Actual Cost SFY 2018	(See Addendum Sept. 2018)	SPR18DVS

TECHNOLOGY TRANSFER

Purpose and Scope: Technology transfer provides mechanisms to coordinate the transfer of research results and information with MoDOT divisions and districts as well as with outside organizations. The Local Technical Assistance Program provides transportation information and training opportunities to local transportation agencies. Funding is provided to match other funds to support the BEAP and the TEAP. These programs offer assistance to local entities for bridge design and traffic studies. In addition, technology transfer provides direction and support to department personnel to maintain an understanding of new methodologies and technologies.

<u>Financials</u>	<u>Amount</u>	<u>Work ID Code</u>
Projected Budget SFY 2019	\$497,500	SPR19TTS
Budget Amount SFY 2018	\$493,000	SPR18TTS
Actual Cost SFY 2018	(See Addendum Sept. 2018)	SPR18TTS

Certification Statement

I, Dave Ahlvers, State Construction and Materials Engineer, of the State of Missouri, do hereby certify that the State is in compliance with all requirements of 23 U.S. Code 505 and its implementing regulations with respect to the research, development, and technology transfer program, and contemplate no changes in statutes, regulations, or administrative procedures which would affect such compliance.



Research Administrator

June 21, 2018
Date

Part III Research Summary

Project No.	Project Name	SFY2019 Budget
TA196601	Research Administration	\$256,313
TR19CONT	Research Contingencies	\$591,035
TR201313	Secretary of State Library MOU	\$5,103
TR201518	Roller Compacted Concrete	\$7,040
TR201522	MoDOT Customer Satisfaction Tracking Survey	\$12,947
TR201601	Library Support Contract (2016-2017)	\$0
TR201609	MEPDG Local Calibration	\$73,690
TR201610	AASHTO Technical Service Program	\$140,000
TR201613	Work Zone Split Traffic Symbol Sign	\$0
TR201614	Zero Cement Concrete	\$1,378
TR201616	Missouri Highway Safety Manual Recalibration	\$0
TR201701	Internal Curing	\$0
TR201702	High Volume Recycled Materials Phase II	\$4,543
TR201703	Economical and Crack Free High Performance Concrete Phase II	\$1,707
TR201704	Design of Ultra High Performance Concrete for Thin Overlays	\$0
TR201705	Implementation of FR SCC and FR SWC Phase II	\$13,221
TR201709	Runway Condition Index for State Funded Airports	\$0
TR201710	MoDOT Fleet Analysis	\$0
TR201711	Economic Impact Study for Public Ports	\$0
TR201712	Performance Characteristics of Recycled Asphalt	\$5,217
TR201713	Cold Temperature Creep Compliance	\$0
TR201714	Investigation of Existing Foundations under Consideration for Reuse	\$0
TR201715	Erosion Control Blanket Workshop Training	\$0
TR201717	Auto Flagger	\$0
TR201720	Rejuvenating Asphalt Products	\$36,792
TR201722	Evaluation of Green Lights on TMAs	\$0
TR201724	MoDOT Report Card Survey	\$0
TR201725	USGS Scan of Gasconade River Bridges	\$0
TR201801	Library Support Contract (2018-2019)	\$100,000
TR201802	IC-IR Consultant Contract-Phase 2	\$0
TR201803	Facebook Surveys—RTS Fiscal Year 2018	\$0
TR201804	Field Implementation of Rubberized Chip Seal	\$16,967
TR201806	Performance-Based Specifications of Fiber-Reinforced Concrete to Enhance Performance and Reduce Steel-Reinforcement in Structural Members	\$45,206
TR201807	Understanding and Improving Heterogeneous, Modern Recycled Asphalt Mixes	\$242,000
TR201808	UAS State of the Practice for Transportation	\$0
TR201809	Assessment and Repair of Corroded Steel H-Piles	\$83,211
TR201811	Support for Balanced Asphalt Mixture Design Specification	\$135,917

	Development in Missouri	
TR201812	Infrastructure Conference Invoice-Fiscal Year 2018	\$3,000
TR201813	Leader-Follower TMA System	\$192,472
TR201814	Leader-Follower TMA System Misc. Expenses	\$16,100
TR201815	TITAN - An Interactive Web-based Platform for Transportation Data InTegration and ANalytics	\$24,992
TR201903	Facebook Surveys--RTS Fiscal Year 2019	\$11,370
TD170701	New Product Evaluation	\$93,090
TTAPT001	Local Technical Transfer Assistance Program (LTAP)	\$300,000
TT200701	National Highway Institute (NHI)	\$40,000
TTAPT001	BEAP and TEAP	\$157,500
	Total	\$2,610,811

Administration – SPR19ADS

Estimated Cost - \$256,313

TAyy6601 - Research Administration

Project Type: Contracts Other

MoDOT Contact: Bill Stone

Total Contract Amount: \$256,313

Contract Period: 7/1/1966 to 6/30/2019

Funding: SPR 80%, State 20%

Project Description and Objectives:

Research administration is a funding source for the administration of research activities. This includes office support such as phone, supplies, and office equipment. The type of project is "contract other" because project work will include contract management. The purpose of this item is to provide funds for the development and monitoring of a program designed to meet the research needs of the Missouri Department of Transportation.

Proposed Activities for SFY 2019:

The salary and expenses of the Research Administrator and Research Engineer will be charged against this item.

SFY 2018 Accomplishments:

The Research Section had 42 active contract research projects and a total of 9 projects were completed at the end of the third quarter. The research Section also published 15 reports as of May 17, 2018.

Financials

Projected Budget SFY 2019
 Budget Amount SFY 2018
 Actual Cost SFY 2018
 Prior to SFY 2018 Actual Cost

Amount

\$256,313
 \$254,751
 (See Addendum Sept. 2018)
 N/A

Research – SPR19RDS

Estimated Cost - \$1,763,908

TRyyCONT - Research Contingencies

Project Type: Contracts Other
MoDOT Contact: Bill Stone
Total Contract Amount: \$591,035
Contract Period: 7/1/2018 to 6/30/2019
Contract Investigator: N/A
Funding: SPR 80%, State 20%

Project Description and Objectives:

Research and development contingencies are funds for unanticipated costs on current or new activities. These funds are for proposed research projects that are in the initiation stage and for unanticipated projects during the year. The type of project is "Contract Other" because project funded work will include contract management and contract expenditures.

Proposed Activities for SFY 2019:

In addition to funds for unanticipated costs on current or ongoing activities, funds have been included for studies that may be initiated during Fiscal Year 2019. These include administrative and other eligible costs.

SFY 2018 Accomplishments:

Fourteen new projects were approved for funding in Fiscal Year 2018.
 TR201802 IC-IR Consultant Contract-Phase 2
 TR201803 Facebook Surveys—RTS Fiscal Year 2018
 TR201804 Field Implementation of Rubberized Chip Seal
 TR201805 HFST Before and After Crash Study
 TR201806 Performance-Based Specifications of Fiber-Reinforced Concrete to Enhance Performance and Reduce Steel-Reinforcement in Structural Members
 TR201807 Understanding and Improving Heterogeneous, Modern Recycled Asphalt Mixes
 TR201808 UAS State of the Practice for Transportation
 TR201809 Assessment and Repair of Corroded Steel H-Piles
 TR201810 Tire Derived Aggregate for Slope Stability
 TR201811 Support for Balanced Asphalt Mixture Design Specification Development in Missouri
 TR201812 Infrastructure Conference Invoice-Fiscal Year 2018
 TR201813 Leader-Follower TMA System

TR201814 Leader-Follower TMA System Misc. Expenses

TR201815 TITAN - An Interactive Web-based Platform for Transportation Data InTegration and ANalytics

Financials

	<u>Amount</u>
Projected Budget SFY 2019	\$591,035
Budget Amount SFY 2018	\$232,274
Adjusted Budget Amount SFY 2018	\$0
Actual Cost SFY 2018	(See Addendum Sept. 2018)
Prior to SFY 2018 Actual Cost	N/A

TR201313 - Secretary of State Library MOU

Project Type: Contract Research

MoDOT Contact: Bill Stone

Total Contract Amount: \$28,488

Contract Period: 7/1/2013 to 6/30/2019

Contract Investigator: Waheedah Bilal

Funding: SPR 80%, State 20%

Project Description and Objectives:

MoDOT has established a library to serve employees, researchers and industry partners. This library contains materials (hardcopy and electronic) that are catalogued according to current national bibliographic standards. MoDOT and the Secretary of State Library have executed a Memorandum of Understanding that outlines the responsibilities of each organization. MoDOT and the Secretary of State Library agree to maintain the MoDOT library collection at the Missouri State Library. The library holdings will be included in the state library's integrated online library catalog. The bibliographic records in the MoDOT library collection will be included in the statewide MOBIUS catalog to facilitate resource sharing.

Proposed Activities for SFY 2019:

It is expected that the 2019 invoice will be received and sent for payment during first quarter.

SFY 2018 Accomplishments:

The 2018 MOU was executed by MoDOT on August 23, 2017. The invoice for the amount of \$4,954.82 was processed on September 18, 2017. The 2019 MOU has been developed and is awaiting SOS signatures (anticipated amount is \$5,103.46).

Financials

	<u>Amount</u>
Projected Budget SFY 2019	\$5,103
Budget Amount SFY 2018	\$4,955
Actual Cost SFY 2018	(See Addendum Sept. 2018)
Prior to SFY 2018 Actual Cost	\$18,430

TR201518 - Roller Compacted Concrete**Project Type:** Contract Research**MoDOT Contact:** Bill Stone**Total Contract Amount:** \$90,000**Contract Period:** 12/1/2014 to 9/30/2017**Contract Investigator:** Dr. Kamal Khayat**Funding:** SPR 80%, State 20%**Project Description and Objectives:**

Increasing interest in decreasing the time and cost in pavement construction, research was recently been undertaken at Missouri S&T in collaboration with the NUTC and MoDOT to investigate the in-situ properties of RCC mixtures in pavement applications. The proposed project will investigate cost-effective, rapid pavement construction techniques that can reduce construction cost and duration. The roller roller-compacted concrete (RCC) with or without an asphalt topping will be investigated. The study will aim at the development of mixture optimization methodology to design novel materials that can be used in rapid pavement construction through detailed laboratory testing and field implementation. The mixture proportions will be developed to achieve the mixture with satisfactory workability and mechanical and durability properties.

Proposed Activities for SFY 2019:

Continue to monitor the progress of the Scott City compacted concrete project and develop the monitoring and instrumentation plan for that project. This will include the need to develop a Second Supplemental Agreement to extend the contract and account for the instrumentation hardware. The National Road Research Alliance (NRRRA) has developed a work plan that will utilize the Missouri S&T project and leverage some NRRRA funds. The work for the Scott County project is August/September 2018.

SFY 2018 Accomplishments:

MoDOT is developing plans for the inclusion of approximately a two-mile section of outer road utilizing compacted concrete on a MoDOT project to be let later this year near Scott City in the Southeast District along I-55. The project has essentially been put on hold awaiting an updated schedule for both the Accelerated Innovation and Deployment (AID) award and the Scott County project. The project has not been extended with a firm completion date until the field project has a firm work plan and schedule.

Financials

	<u>Amount</u>
Projected Budget SFY 2019	\$7,040
Budget Amount SFY 2018	\$9,079
Adjusted Budget Amount SFY 2018	\$2,039
Actual Cost SFY 2018	(See Addendum Sept. 2018)
Prior to SFY 2018 Actual Cost	\$80,921

TR201522 - MoDOT Customer Satisfaction Tracking Survey**Project Type:** Contract Research**MoDOT Contact:** Bill Stone**Total Contract Amount:** \$130,556**Contract Period:** 3/4/2015 to 1/31/2019**Contract Investigator:** Lance Gentry**Funding:** SPR 80%, State 20%

Project Description and Objectives:

This study evaluates MoDOT customer satisfaction through use of a customer survey. This survey will be conducted quarterly to evaluate MoDOT's overall satisfaction. The Right Transportation Survey (RTS) will be conducted once under this contract.

Proposed Activities for SFY 2019:

During each month of the quarter, approximately 200 people who contacted MoDOT the previous month will be surveyed by phone about their experience along with online surveys being distributed to those who provided an email address. A summary report will be provided to MoDOT each month. The contract end date for the project is January 31, 2019. All activities for the Right Transportation Solution surveying were previously completed in Fiscal Year 2016.

SFY 2018 Accomplishments:

During each month of the quarter, approximately 200 people who contacted MoDOT the previous month were surveyed by phone about their experience along with online surveys being distributed to those who provided an email address. A summary report was provided to MoDOT each month. The annual report for calendar year 2017 was also created and provided in January 2018. The first extension for the project was approved and was executed on February 26, 2018 and has a completion date of January 31, 2019. The new supplemental agreement includes only the Customer Relations portion of the project. The Right Transportation Solutions efforts are not covered for future efforts as part of this project.

Financials

	<u>Amount</u>
Projected Budget SFY 2019	\$12,947
Budget Amount SFY 2018	\$12,887
Adjusted Budget Amount SFY 2018	\$11,046
Actual Cost SFY 2018	(See Addendum Sept. 2018)
Prior to SFY 2018 Actual Cost	\$106,563

TR201601 - Library Support Contract (2016-2017)—Completed

Project Type: Contract Research

MoDOT Contact: Bill Stone

Total Contract Amount: \$181,077

Contract Period: 7/1/2015 to 6/30/2017

Contract Investigator: Charles Nemmers

Funding: SPR 80%, State 20%

Project Description and Objectives:

The demand for information services has increased as more MoDOT users are realizing the timely, diverse and high quality information they receive using the services of the current librarian. The major objective of this project is to provide library, research and reference support services for MoDOT. University of Missouri-Columbia will provide the services of a Master of Library Science (MLS) librarian who will work 40 hours per week and will be located at the Secretary of State's State Library and MoDOT in Jefferson City.

Proposed Activities for SFY 2019:

The project was completed in SFY 2018.

SFY 2018 Accomplishments:

The only work taking place in SFY 2018 was processing the final invoice. The final invoice posted on September 18, 2017 and the project was closed.

Financials

	<u>Amount</u>
Projected Budget SFY 2019	\$0
Budget Amount SFY 2018	\$10,394
Actual Cost SFY 2018	(See Addendum Sept. 2018)
Prior to SFY 2018 Actual Cost	\$170,683

TR201609 - MEPDG Local Calibration

Project Type: Contract Research

MoDOT Contact: Jen Harper

Total Contract Amount: \$254,950

Contract Period: 3/2/2016 to 6/15/2018

Contract Investigator: Chetana Rao

Funding: SPR 80%, State 20%

Project Description and Objectives:

The Missouri Department of Transportation (MoDOT) has always relied on sound engineering for designing new and rehabilitated pavements. The current design approach is the Mechanistic-Empirical Pavement Design Guide (MEPDG), developed under a series of National Cooperative Highway Research Projects (NCHRP). The MEPDG utilizes existing state-of-the-practice mechanistic-based pavement analysis and distress prediction algorithms.

Enough time has elapsed to perform a second local calibration cycle. During this interim period, more performance data has been collected from the original field test sections. In addition, newer models have been introduced to the AASHTO Pavements ME Design Guide software that requires a first local calibration. Greater emphasis will be placed on the rehabilitation models.

Objectives:

- Perform a second local calibration of distress prediction models for existing field test sections.
- Supplement existing test sections with additional rehabilitation pavement sections.
- Perform a first local calibration of newer prediction models in the AASHTO Pavement ME Design Program
- Update the materials database library with contemporary pavement materials properties, including reclaimed materials.
- Fully document the local calibration work, including clear guidance for changing calibration coefficients. Update the user manual. Provide recommendations and precise details of any suggested /incorporated changes.

Proposed Activities for SFY 2019:

Final Validation of MEPDG models for flexible pavements will have to wait until a new version is released on July 1, 2018. All work will be completed in Fiscal Year 2018 except the portions dealing with the flexible pavement. Work should be completed in the first quarter of Fiscal Year 2019.

SFY 2018 Accomplishments:

After the completion of a preliminary validation of the ME models using LTPP data, it was recognized that data from MoDOT pavement management sections were not adequate for M-E model validations, primarily because of the absence of distress data in a format consistent with MEPDG distress prediction. The project team and MoDOT decided to use new field test data which would require additional time resulting in the extension of project schedule. Some of the project work was stalled towards the middle of the fiscal year while waiting on the data from MoDOT. During the third quarter the data was ready for the project team and work proceeded on all but the flexible pavement calibration.

Financials

	<u>Amount</u>
Projected Budget SFY 2019	\$73,690
Budget Amount SFY 2018	\$150,317
Adjusted Budget Amount SFY 2018	\$81,577
Actual Cost SFY 2018	(See Addendum Sept. 2018)
Prior to SFY 2018 Actual Cost	\$99,683

TR201610 - AASHTO Technical Service Program

Project Type: Contract Research

MoDOT Contact: Bill Stone

Total Contract Amount: \$193,000

Contract Period: 7/1/2014 to 06/30/2019

Contract Investigator: FHWA

Funding: SPR 100%

Project Description and Objectives:

Each year, the Standing Committee on Highways and the board of directors of American Association of State Highway and Transportation Officials (AASHTO) approves the listing of Technical Service Programs. The type of project is "Contract Other" because the project is to participate in the Technical Service Programs. The purpose of this item is to support continued participation in various AASHTO Technical Service Programs.

Proposed Activities for SFY 2019:

MoDOT's Construction and Materials Division is expected to participate in the following AASHTO Technical Service Programs for Fiscal Year 2019:

- National Transportation Product Evaluation Program (NTPEP), \$17,000.
- AASHTO Innovation Initiative (AII), formerly Technology Implementation Group (TIG), \$6,000.
- Transportation Curriculum Coordination Council (TC3), \$20,000
- Technical Service Program to Develop AASHTO Materials Standards (DAMS), \$10,000.

The total amount for SFY2019 for Construction and Materials is \$53,000. Other MoDOT Divisions are participating in various Technical Service Programs.

SFY 2018 Accomplishments:

The Construction Materials Division approved the funding of four AASHTO Technical Services Programs. These are the NTPEP program (\$17,000), AASHTO Innovation Initiative (\$6,000), Transportation Curriculum Coordination Council (\$20,000) and Technical Service Program to Develop AASHTO Materials Standards (DAMS), \$10,000. The total of \$53,000 was processed on September 20, 2016. An error was made in the 2018 SPR Work Program. It provided the amount of \$5,000 for the

Technical Service Program to Develop AASHTO Materials Standards (DAMS). The correct amount is \$10,000. Therefore the correct Budget Amount for SFY2018 should have been \$53,000. This is being shown as the “Adjusted Budget Amount SFY 2018” below.

<u>Financials</u>	<u>Amount</u>
Projected Budget SFY 2019	\$140,000
Budget Amount SFY 2018	\$48,000
Adjusted Budget Amount SFY 2018	\$53,000
Actual Cost SFY 2018	(See Addendum Sept. 2018)
Prior to SFY 2018 Actual Cost	N/A

TR201613 - Work Zone Split Traffic Symbol Sign—Completed

Project Type: Contract Research
MoDOT Contact: Jen Harper
Total Contract Amount: \$75,000
Contract Period: 5/15/2016 to 8/31/2017
Contract Investigator: Praveen Edara
Funding: SPR 80%, State 20%

Project Description and Objectives:

MoDOT's St. Louis District has gotten FHWA approval to do a pilot project using a new work zone sign. The sign is used when work is done in the middle of the roadway and lanes shift around the work zone. Currently 2 MUTCD signs are required, one on either side of the road. The sign being piloted shows all information on 1 sign. A field evaluation is being done to monitor driver reaction and traffic delays.

Proposed Activities for SFY 2019:

The project was completed in Fiscal Year 2018.

SFY 2018 Accomplishments:

The final report was received and published on August 3, 2017. The final invoice was paid on November 30, 2017. This project is completed.

<u>Financials</u>	<u>Amount</u>
Projected Budget SFY 2019	\$0
Budget Amount SFY 2018	\$37,896
Actual Cost SFY 2018	(See Addendum Sept. 2018)
Prior to SFY 2018 Actual Cost	\$37,104

TR201614 - Zero Cement Concrete

Project Type: Contract Research
MoDOT Contact: William Stone
Total Contract Amount: \$100,000
Contract Period: 1/3/2017 to 4/30/2018
Contract Investigator: Dr. Mohamad ElGawady
Funding: SPR 80%, State 20%

Project Description and Objectives:

Conventional concrete mixes use ordinary Portland cement (OPC) or OPC and fly ash as the main binding material. Conventional concrete involves slow process of hydration of the OPC/fly ash. Zero-cement (ZC) concrete is a relatively new class of concrete that does not include any Portland cement. The overarching objective of this research is to develop zero-cement concrete mixtures that can be used by MODOT contractors for bridge deck and girders using locally available material. The feasibility of using ZC concrete for partial depth deck and prestressed girder repair works will be explored as well.

Proposed Activities for SFY 2019:

The project was completed in State Fiscal Year 2018.

SFY 2018 Accomplishments:

The Draft Report was received on March 14, 2018. MoDOT has reviewed the report and has submitted comments to the researchers for revisions for the Final Report. Comments from other staff necessary to submit to the principal investigator have not been received. Therefore, the final report will be finalized in the first quarter of Fiscal Year 2019.

Financials

	<u>Amount</u>
Projected Budget SFY 2019	\$1,378
Budget Amount SFY 2018	\$74,338
Adjusted Budget Amount SFY 2018	\$72,960
Actual Cost SFY 2018	(See Addendum Sept. 2018)
Prior to SFY 2018 Actual Cost	\$25,662

TR201616 - Missouri Highway Safety Manual Recalibration—Completed

Project Type: Contract Research

MoDOT Contact: Jen Harper

Total Contract Amount: \$146,282

Contract Period: 4/18/2016 to 12/31/2017

Contract Investigator: Carlos Sun

Funding: SPR 80%, State 20%

Project Description and Objectives:

AASHTO's Highway Safety Manual (HSM) was calibrated in 2013 using 2009 to 2011 data to reflect Missouri driver population, conditions, and environment. This project involves the recalibration of the HSM for Missouri. All 25 HSM values (16 facilities) that were previously calibrated will be recalibrated using additional data since 2011. The facilities that previously resulted in calibration values close to or higher than 2.0 will be carefully reviewed. In addition, crash severity distributions in terms of fatal, severe injury, minor injury, and property damage only (PDO) will be produced.

Proposed Activities for SFY 2019:

The project was completed in Fiscal Year 2018.

SFY 2018 Accomplishments:

The draft report was received on October 15, 2017. The MoDOT technical panel reviewed the report and submitted questions and corrections. The final report was received on January 30, 2018. It was accepted and published in the innovation library. The final invoice posted on March 5, 2018. This project is closed.

Financials

	<u>Amount</u>
Projected Budget SFY 2019	\$0
Budget Amount SFY 2018	\$55,961
Adjusted Budget Amount SFY 2018	\$56,266
Actual Cost SFY 2018	(See Addendum Sept. 2018)
Prior to SFY 2018 Actual Cost	\$90,016

TR201701 - Internal Curing—Completed**Project Type:** Contract Research**MoDOT Contact:** Jen Harper**Total Contract Amount:** \$50,000**Contract Period:** 7/1/2016 to 2/28/18**Contract Investigator:** Dr. Kamal Khayat**Funding:** SPR 80%, State 20%**Project Description and Objectives:**

The project seeks to develop proper methodology to use internal curing materials to improve the performance and to prolong the service life of concrete. Typical mix design of high-performance concrete (HPC) approved by MoDOT will be used for the baseline mixture and will be modified with different types and contents of materials used for internal curing. The project will establish new mix design and curing recommendations of concrete made with internal curing materials and validate their performance through laboratory investigation and field demonstration.

Proposed Activities for SFY 2019:

The project was completed in Fiscal Year 2018.

SFY 2018 Accomplishments:

Specimen preparation and testing took longer than anticipated and there were some equipment failures. The PI requested a no cost extension. The contract extension was executed on November 2, 2017. The new completion date is February 28, 2018. The draft report was submitted on December 12, 2017. The MoDOT Research Section has begun reviewing the report and will submit questions/corrections to the research team early next quarter. The final report was received on March 12, 2018 and was published in the Innovation Library. The final invoice was received during the 4th quarter and this project is officially closed.

Financials

	<u>Amount</u>
Projected Budget SFY 2019	\$0
Budget Amount SFY 2018	\$20,817
Actual Cost SFY 2018	(See Addendum Sept. 2018)
Prior to SFY 2018 Actual Cost	\$29,183

TR201702 - High Volume Recycled Materials Phase II**Project Type:** Contract Research**MoDOT Contact:** Bill Stone**Total Contract Amount:** \$69,687**Contract Period:** 7/1/2016 to 7/31/2018**Contract Investigator:** Dr. Kamal Khayat**Funding:** SPR 80%, State 20%**Project Description and Objectives:**

The presented research plan proposes a field-oriented study as a follow-up of the Project Number TR201502 entitled “High-Volume Recycled Materials for Sustainable Pavement Construction”. The main goal of this project is to validate findings of the previous research project in the field implementation and to develop guidelines for the selection and use of recycled concrete aggregate (RCA) for sustainable pavement construction. The scope of the proposed research plan includes the construction of full-scale pavement sections and implementation in the actual construction projects in collaboration with Missouri Department of Transportation (MoDOT). The project team will assist in planning, field implementation, and monitoring of pilot projects in the state of Missouri.

Proposed Activities for SFY 2019:

The final report submission date will need to be extended. At the time of this review MoDOT is looking at a possible field implementation project near Sikeston which is being let in May 2017. The project is let, however the contractor is still working on the details for the compacted concrete and we’ll still need to work on potential for RCA inclusion.

SFY 2018 Accomplishments:

Research is currently in progress toward evaluating the life cycle assessment (LCA) and life cycle cost analysis (LCCA) of the proposed optimal concretes under Task 4 (life cycle assessment) of the proposal. This part of the research is currently underway in conjunction with New York University. Furthermore, under MoDOT’s approval, the required sensors and data acquisition systems have been properly designed and procured. The research team is collaborating/following up with MoDOT to finalize the transportation infrastructure element types and locations for field implementation. The research team also worked on instrumentation details which will be finalized based on the requirements of the job selected. Preliminary results of Life Cycle Cost Analysis (LCCA) were obtained.

Financials

	<u>Amount</u>
Projected Budget SFY 2019	\$4,543
Budget Amount SFY 2018	\$1,958
Adjusted Budget Amount SFY 2018	\$27,102
Actual Cost SFY 2018	(See Addendum Sept. 2018)
Prior to SFY 2018 Actual Cost	\$38,042

TR201703 - Economical and Crack Free High Performance Concrete Phase II**Project Type:** Contract Research**MoDOT Contact:** Bill Stone**Total Contract Amount:** \$69,687**Contract Period:** 7/1/2016 to 7/31/2018**Contract Investigator:** Dr. Kamal Khayat**Funding:** SPR 80%, State 20%

Project Description and Objectives:

The research plan that is proposed here is a follow up of the two-year project and aims to investigate and validate the performance of Eco-HPC mixtures under actual field conditions. The main goal of this follow-up project is to validate findings of the previous research project in the field implementation and to develop guidelines for the use of Eco-HPC for sustainable pavement and transportation infrastructure construction. The project will employ two classes of Eco-HPCs for the following field demonstrations: Eco-Pave-Crete for pavement construction and Eco-Bridge-Crete for transportation infrastructure construction. The project will establish guidelines for material selection, mix design, casting, and performance of such sustainable infrastructure materials through the validation of field implementation.

Proposed Activities for SFY 2019:

The project has a final report submission date of June 30, 2018. However, the research includes laboratory investigation, field implementation, field survey, life-cycle analysis and development of recommendations and guidelines. The field implementation effort will still need to identify a location to place the Eco-HPC

SFY 2018 Accomplishments:

The research team completed the evaluation of the life cycle assessment (LCA) and life cycle cost analysis (LCCA) of the proposed optimal concrete mixtures under Task 4 (life cycle assessment) of the proposed work. The analysis includes MoDOT recommended mixtures for pavement and bridge construction that were considered as reference mixtures.

Financials

	<u>Amount</u>
Projected Budget SFY 2019	\$1,707
Budget Amount SFY 2018	\$1,510
Adjusted Budget Amount SFY 2018	\$29,490
Actual Cost SFY 2018	(See Addendum Sept. 2018)
Prior to SFY 2018 Actual Cost	\$38,490

TR201704 - Design of Ultra High Performance Concrete for Thin Overlays—Completed

Project Type: Contract Research

MoDOT Contact: Jen Harper

Total Contract Amount: \$40,000

Contract Period: 7/1/2016 to 2/14/18

Contract Investigator: Dr. Kamal Khayat

Funding: SPR 80%, State 20%

Project Description and Objectives:

The main objective of this research is to develop a UHPC as a reliable, economic, low carbon foot print and durable concrete overlay material that can offer shorter traffic closures due to faster construction and long-term service life. This project aims at maximizing the performance of a thin layer of pavement material by reaching to an optimized composition of SCMs and proper types and amounts of fibers.

Proposed Activities for SFY 2019:

The project was completed in State Fiscal Year 2018

SFY 2018 Accomplishments:

The first two quarters were spent finishing up laboratory testing and preparing the final report. The draft report was due on December 31, 2017, but it was not received until mid-January. The final report was received on March 19, 2018; however there were still some errors in the report. The report was sent back to the PI for editing. The final version was received on April 4, 2018. The final invoice was received during the 4th quarter and this project is officially closed.

Financials

	<u>Amount</u>
Projected Budget SFY 2019	\$0
Budget Amount SFY 2018	\$8,570
Actual Cost SFY 2018	(See Addendum Sept. 2018)
Prior to SFY 2018 Actual Cost	\$31,430

TR201705 - Implementation of FR SCC and FR SWC Phase II

Project Type: Contract Research

MoDOT Contact: Bill Stone

Total Contract Amount: \$64,828

Contract Period: 7/1/2016 to 7/31/2018

Contract Investigator: Dr. Kamal Khayat

Funding: SPR 80%, State 20%

Project Description and Objectives:

The proposed study seeks to investigate key engineering and structural properties of FR-SCC and fiber-reinforced super workable concrete (FR-SWC) for infrastructure repair and construction. FR-SCC is targeted for repair of sub-structure elements, while the FR-SWC is targeted for construction operations. The expected result from this study will be guidelines and performance-based specifications for the evaluation, selection, and specification of FR-SCC for infrastructure repair of bridge substructures and FR-SWC for the construction of bridge substructure and superstructure elements.

Proposed Activities for SFY 2019:

The research team will continue to monitor the fresh properties and mechanical properties of the samples taken the night of the pour. The monitoring of the concrete deck for strain, temperature and humidity at the six locations over the intermediate bent will continue. Draft report was received on June 15, 2018. Comments to the draft will be submitted and then review of final report.

SFY 2018 Accomplishments:

The replacement of the bridge deck for Bridge A8509 over Route 50 near Taos, Missouri was let on March 23, 2017. The bridge incorporated steel and poly fibers in the bridge deck. A cost and time extension was necessary to accomplish the monitoring of the bridge. The research team worked with the ready-mix supplier to finalize the mix design. The placement of the 10 foot x 10 foot mock-up occurred on July 11, 2017. The flow on the concrete was good and appeared to consolidate well around the rebar. It was a very warm humid morning when the mock-up was placed and it was difficult to float and finish. A finishing aid was used and worked well to finish the surface. The finishing aid was accepted for use on the overall deck placement based on what was learned from the mock-up. Draft report was received on June 15, 2018.

Financials

	<u>Amount</u>
Projected Budget SFY 2019	\$13,221
Budget Amount SFY 2018	\$10,166
Adjusted Budget Amount SFY 2018	\$21,773
Actual Cost SFY 2018	(See Addendum Sept. 2018)
Prior to SFY 2018 Actual Cost	\$29,834

TR201709 - Runway Condition Index for State Funded Airports—Completed**Project Type:** Contract Research**MoDOT Contact:** Jen Harper**Total Contract Amount:** \$199,856**Contract Period:** 12/15/2016 to 3/30/2018**Contract Investigator:** Jay Bledsoe**Funding:** SPR 80%, State 20%**Project Description and Objectives:**

Perform a pavement condition index (PCI) study on all state airport pavements. The PCI study would help to develop a pavement management program (PMP) to efficiently allocate state aviation funds towards maintenance in order to keep the airport pavements in good condition.

Proposed Activities for SFY 2019:

The project was completed in State Fiscal Year 2018.

SFY 2018 Accomplishments:

The team met with MoDOT on August 9, 2017 to present preliminary results. Two separate reports were prepared, one on the airport condition part of the project and one on the smartphone app IRI part of the project. Twenty-seven separate mini reports, one for each airport, were written. The research team also created a webpage with information on each airport including pavement condition and anticipated future condition. All reports were received during the 3rd quarter and were accepted. The website had a few kinks to work out but were resolved early during the 4th quarter. The final invoice was received during the 4th quarter and this project is officially closed.

Financials

	<u>Amount</u>
Projected Budget SFY 2019	\$0
Budget Amount SFY 2018	\$135,692
Actual Cost SFY 2018	(See Addendum Sept. 2018)
Prior to SFY 2018 Actual Cost	\$64,164

TR201710 - MoDOT Fleet Analysis—Completed**Project Type:** Contract Research**MoDOT Contact:** Bill Stone**Total Contract Amount:** \$179,358**Contract Period:** 4/4/2017 to 4/18/2018**Contract Investigator:** Henry Canipe**Funding:** SPR 80%, State 20%

Project Description and Objectives:

Develop a process to track and administer an evaluation process for multiple chassis/bodybuilder combinations. How can MoDOT evaluate their selections through a competitive bid basis.

Proposed Activities for SFY 2019:

The project was completed in State Fiscal Year 2018.

SFY 2018 Accomplishments:

The agreement was executed between MHTC and the Kercher Group on April 4, 2017. MoDOT hosted the kickoff meeting on April 24, 2017 and shared data files with the vendor. The final report and all project fleet data has been accepted by MoDOT. The final invoice was submitted for processing on April 6, 2018.

Financials

	<u>Amount</u>
Projected Budget SFY 2019	\$0
Budget Amount SFY 2018	\$56,971
Adjusted Budget Amount SFY 2018	\$140,771
Actual Cost SFY 2018	(See Addendum Sept. 2018)
Prior to SFY 2018 Actual Cost	\$38,587

TR201711 - Economic Impact Study for Public Ports—Completed

Project Type: Contract Research

MoDOT Contact: Jen Harper

Total Contract Amount: \$360,255

Contract Period: 12/15/2016 to 6/1/2018

Contract Investigator: Paula Dowell

Funding: SPR 80%, State 20%

Project Description and Objectives:

Missouri has access to over 1,000 miles of the Missouri and Mississippi Rivers. These natural assets are a vital link to Missouri's transportation chain. While public ports play an integral role in the transport of freight into and out of Missouri; it can be difficult to quantify the economic impacts ports bring to the state. Many ports rely on state or federal dollars to make infrastructure improvements, but it is difficult to secure these funds without this information. The objective of this project is to quantify the economic impacts of ports to the Missouri economy. Direct, indirect and induced impacts will be identified and quantified. The economic impact of funding port improvements will also be included in the analysis.

Proposed Activities for SFY 2019:

The project was completed in State Fiscal Year 2018.

SFY 2018 Accomplishments:

A draft of an individual port brochure was sent on September 5, 2017 for approval before all of the port brochures were developed. Drafts of all port brochures were submitted at the end of September. A meeting was held on October 4 to discuss the final products and all final deliverables before submission. The individual port brochures were submitted to MoDOT in October and the draft report was submitted to MoDOT in November. A no-cost extension was completed in the 2nd quarter. Part of the original scope of the project was for the research to be presented to the legislative committee on ports which had been scheduled to take place in November 2017 but was postponed until early 2018. The final project

brochures and final report were posted to the Innovation Library in early February. The research team presented to the house transportation committee on February 21, 2018 and then again to the Missouri Chamber 2018 Missouri Transportation Future Summit on February 22nd. The final invoice was received during the 4th quarter and this project is officially closed.

Financials**Amount**

Projected Budget SFY 2019	\$0
Budget Amount SFY 2018	\$298,675
Actual Cost SFY 2018	(See Addendum Sept. 2018)
Prior to SFY 2018 Actual Cost	\$61,580

TR201712 - Performance Characteristics of Recycled Asphalt

Project Type: Contract Research

MoDOT Contact: Bill Stone

Total Contract Amount: \$200,000

Contract Period: 10/14/2016 to 4/30/2018

Contract Investigator: Bill Buttlar

Funding: SPR 80%, State 20%

Project Description and Objectives:

Evaluating performance characteristics of ground tire rubber, recycled roofing shingles and rejuvenators in recycled asphalt pavements in the Midwest climate.

Proposed Activities for SFY 2019:

Comments from other staff necessary to submit to the principal investigator have not been received.

Therefore, the final report will be finalized in the first quarter of Fiscal Year 2019.

A short time extension will be considered to complete the MoDOT review.

SFY 2018 Accomplishments:

The literature review was done in the first quarter. Mid project presentation occurred on April 21st. The Draft Final Report was received by MoDOT on March 26, 2018. MoDOT is still reviewing the Draft at the time of this writing. The decision was made to consider the project "Late" rather than execute a short time extension to review and accept the Final Report.

Financials**Amount**

Projected Budget SFY 2019	\$5,217
Budget Amount SFY 2018	\$99,205
Adjusted Budget Amount SFY 2018	\$93,988
Actual Cost SFY 2018	(See Addendum Sept. 2018)
Prior to SFY 2018 Actual Cost	\$100,795

TR201713 - Cold Temperature Creep Compliance—Completed**Project Type:** Contract Research**MoDOT Contact:** Jen Harper**Total Contract Amount:** \$80,174**Contract Period:** 10/14/2016 to 9/30/2017**Contract Investigator:** Mike Lusher**Funding:** SPR 80%, State 20%**Project Description and Objectives:**

The objective of this project is to determine hot mix asphalt (HMA) thermal cracking properties to use as inputs for MEPDG pavement distress prediction models.

Proposed Activities for SFY 2019:

The project was completed in State Fiscal Year 2018.

SFY 2018 Accomplishments:

The first two months of fiscal year 2018 were spent finishing up the testing for the project. The draft final report was sent to MoDOT on September 22, 2017. The final report was received September 30, 2017 and was posted to the innovation library. The final invoice was actually miscalculated and the university sent a refund to MoDOT. This refund was processed on January 9, 2018. This project is officially closed.

Financials

Projected Budget SFY 2019

Amount

\$0

Budget Amount SFY 2018

\$12,737

Actual Cost SFY 2018

(See Addendum Sept. 2018)

Prior to SFY 2018 Actual Cost

\$67,437

TR201714 - Investigation of Existing Foundations under Consideration for Reuse—Completed**Project Type:** Contract Research**MoDOT Contact:** Bill Stone**Total Contract Amount:** \$90,000**Contract Period:** 1/1/2017 to 2/28/2018**Contract Investigator:** Andy Boeckmann**Funding:** SPR 80%, State 20%**Project Description and Objectives:**

The objective of this research project is to evaluate different methods for investigating the condition and load capacity of existing foundations. The objective will be achieved by comparing investigation techniques for two bridges in Southeast Missouri that are slated for replacement by MoDOT in 2017. The results of the investigations will be compared with “ground truth” values provided by load testing the existing piles and subsequently exhuming them to assess their condition.

Proposed Activities for SFY 2019:

This project was completed in State Fiscal Year 2018.

SFY 2018 Accomplishments:

All of the testing for the project was completed during the Fiscal Year. The final report was submitted to MoDOT on February 21, 2018. This submission will make the status of the project “late” since it has a February 28, 2018 contract completion date. The review of the draft report was completed by the Construction and Materials Staff during early March. The Bridge Division review and comments were received in early May. All comments to the report were submitted to the PI and the final report was submitted and accepted by MoDOT. The final invoice for the project has been submitted.

Financials

	<u>Amount</u>
Projected Budget SFY 2019	\$0
Budget Amount SFY 2018	\$57,162
Actual Cost SFY 2018	(See Addendum Sept. 2018)
Prior to SFY 2018 Actual Cost	\$32,838

TR201715 - Erosion Control Blanket Workshop Training—Completed

Project Type: Contract Research

MoDOT Contact: Bill Stone

Total Contract Amount: \$4,863

Contract Period: 1/1/2017 to 6/30/2017

Contract Investigator: Amanda Cox

Funding: SPR 80%, State 20%

Project Description and Objectives:

A research project was recently completed by Saint Louis University for the Missouri Department of Transportation (MoDOT) in which new specification guidelines for Erosion Control Blankets (ECBs) were developed that are specific for Missouri hydrology and soils. During this study, workshop materials were developed for MoDOT with the intent that the materials will be used by MoDOT staff to train employees and contractors on the use and specification of ECBs. The purpose of this proposed work is for Saint Louis University (SLU) civil engineering faculty to train MoDOT personnel on how to execute the ECB workshop, which will be accomplished through a train-the-trainer session in Jefferson City.

Proposed Activities for SFY 2019:

This project was completed in State Fiscal Year 2018.

SFY 2018 Accomplishments:

The only work taking place in SFY 2018 was processing the final invoice. The final invoice posted on August 11, 2017 and the project was closed.

Financials

	<u>Amount</u>
Projected Budget SFY 2019	\$0
Budget Amount SFY 2018	\$0
Adjusted Budget Amount SFY 2018	\$4,863
Actual Cost SFY 2018	(See Addendum Sept. 2018)
Prior to SFY 2018 Actual Cost	\$0

TR201717 - Auto Flagger—Completed**Project Type:** Contract Research**MoDOT Contact:** Jen Harper**Total Contract Amount:** \$176,275**Contract Period:** 12/15/2016 to 6/30/2018**Contract Investigator:** Henry Brown**Funding:** SPR 80%, State 20%**Project Description and Objectives:**

Highway workers are often active in areas with vehicles traveling at high speeds. Some methods for improving worker safety involve separating workers from traffic, including the use of buffer spaces and barriers. Flaggers are often located closest to the on-coming traffic in order to direct traffic. The Automated Flagger Assistance Device (AFAD) is a portable system that can be used to control traffic during lane closures on two-lane highways thus replacing human flaggers. The AFAD used in this project is built into a truck-mounted attenuator (TMA) truck, thus providing protection for the AFAD operator who sits in the truck. The goal of this project is to perform a field verification and a driver behavior study of the effectiveness of an AFAD configuration for MoDOT. In addition to worker protection, this AFAD also has the potential benefit of greater visibility by using a large changeable message sign and the TMA checkerboard panel.

Proposed Activities for SFY 2019:

The project was completed in State Fiscal Year 2018.

SFY 2018 Accomplishments:

The simulator study was completed during July. The results were presented to MoDOT on August 9, 2017. One of the results of the study found that the participants did not like the option of the AFAD without the changeable message sign. Due to that conclusion it was determined to not perform phase three which was to do a field trial with and without the changeable message sign. The draft report was submitted on October 31, 2017. Due to a delay in the Traffic Division getting comments back to the researchers the final report due date was pushed back to January 31, 2018. The final report was revised based on MoDOT feedback and submitted to MoDOT on January 30, 2018. The final report was published by MoDOT on February 9, 2018. The research was presented during a technical breakout session at the 2018 TEAM Conference on March 9, 2018. The final invoice posted on March 20, 2018, this project is completed.

Financials

Projected Budget SFY 2019

Amount

\$0

Budget Amount SFY 2018

\$144,334

Actual Cost SFY 2018

(See Addendum Sept. 2018)

Prior to SFY 2018 Actual Cost

\$31,941

TR201720 - Rejuvenating Asphalt Products**Project Type:** Contract Research**MoDOT Contact:** Bill Stone**Total Contract Amount:** \$200,000**Contract Period:** 8/11/17 to 1/31/2020**Contract Investigator:** Jay Bledsoe**Funding:** SPR 80%, State 20%

Project Description and Objectives:

The objective of this investigation is to provide recommendations for creating a performance based specification for rejuvenating and surface sealing products that extend asphalt pavement life. The product evaluation will consider the effectiveness of softening the existing asphalt binder, improving the existing rheological properties (less brittle), and decreasing the permeability of the pavement. The product comparisons will outline the pros and cons to include, but not limited to: the testing results, cure time necessary before opening roadway to traffic, daily production rate, material cost, material location, other economical limitations, application rate utilized and blotting materials utilized, if applicable. A field application study will be performed and evaluated by a third party researcher to provide a report of each product's performance.

Proposed Activities for SFY 2019:

The project will continue with the evaluation cycle for each of the placements on the 3 individual routes. These tests include friction testing, core testing, permeability, retroreflectivity and pavement distress surveys at the prescribed cycles of 7 days (friction), 30 days, 6 months and 1 year. Final field evaluations and deliverables will be performed in State Fiscal Year 2020.

SFY 2018 Accomplishments:

A Request for Information (RFI) was posted on April 14, 2017 and solicited vendors were asked to respond with their interest in participating in the field placements and evaluations. The vendors that were interested submitted products to MoDOT for evaluation and consideration for placement on the selected roadways to be evaluated. All test sites were established and preliminary (baseline) testing was completed. During the fall, construction was only completed on one of the three locations due to weather issues. This was the Route 30, Jefferson County location. The placement of products on Route N, St. Charles County occurred on May 14-16, 2018. Due to equipment issues 3 additional products were placed in the weeks after. Products on Route 52, Morgan County were placed on March 17, 2018. Due to the postponement of placements on Route N and Route 52, a new budget and schedule for future work has been submitted to MoDOT and will be evaluated for its impact to Fiscal Year 2019

Financials

	<u>Amount</u>
Projected Budget SFY 2020	\$5,654
Projected Budget SFY 2019	\$36,792
Budget Amount SFY 2018	\$157,554
Actual Cost SFY 2018	(See Addendum Sept. 2018)
Prior to SFY 2018 Actual Cost	\$0

TR201722 - Evaluation of Green Lights on TMAs—Completed

Project Type: Contract Research

MoDOT Contact: Jen Harper

Total Contract Amount: \$133,235

Contract Period: 4/26/2017 to 6/15/2018

Contract Investigator: Henry Brown

Funding: SPR 80%, State 20%

Project Description and Objectives:

Mobile work zones for various types of moving operations such as striping, sweeping, and pothole filling are an important component of maintaining highways. The Manual on Uniform Traffic Control Devices

(MUTCD) provides guidance for the layout for mobile work zones. Yellow and white lights are typically used on the TMA to help draw motorists' attention to the moving work zone. Despite these precautions, some drivers do not respond to warnings and collide with the TMA. One method for increasing the effectiveness of warnings involves the use of alternative colored lights, such as green, on a TMA. A pilot study of green lights on TMAs was undertaken by MoDOT in 2016 at Lee's Summit Airport. This study will build upon the MODOT pilot study by evaluating driver performance under different light configurations in both simulator and field environments.

Proposed Activities for SFY 2019:

The project was completed in State Fiscal Year 2018.

SFY 2018 Accomplishments:

During the 2nd quarter the simulator design and coding was completed along with the actual simulator trials. The field data collection took place in December. Analysis of the field and simulator data was completed. The research findings were presented to MoDOT on March 5, 2018. Overall, the results showed that all four configurations tested are viable, but none of them is clearly superior. There are tradeoffs between various factors such as visibility and awareness of the work zone, arrow board recognition, and easiness on the eyes. The amber and green configuration may be a reasonable compromise. The report was received and finalized during the 4th quarter. The final invoice was processed and this project is officially closed.

Financials

	<u>Amount</u>
Projected Budget SFY 2019	\$0
Budget Amount SFY 2018	\$100,000
Adjusted Budget Amount SFY 2018	\$133,235
Actual Cost SFY 2018	(See Addendum Sept. 2018)
Prior to SFY 2018 Actual Cost	\$0

TR201724 – MoDOT Report Card Survey

Project Type: Contract Research

MoDOT Contact: Bill Stone

Total Contract Amount: \$142,770

Contract Period: 4/20/2017 to 12/31/2021

Contract Investigator: Lance Gentry

Funding: SPR 80%, State 20%

Project Description and Objectives:

This project is a statewide evaluation of satisfaction from a general population survey of Missouri adults. Results are reported to MHTC and the Missouri Department of Transportation (MoDOT). Provide a statewide evaluation of satisfaction levels with MoDOT performance from a general population telephone survey of Missouri adults. The survey will be conducted every other year in May in years 2017, 2019, and 2021. MoDOT expects this review to result in reports summarizing the data received by using specified methodology. The results are reported in the July MoDOT Tracker.

Proposed Activities for SFY 2019:

The contract was extended and this survey will be conducted in May 2019.

SFY 2018 Accomplishments:

There was not a survey completed in SFY18 however invoices were paid in August and October from the May 2017 survey.

Financials**Amount**

Projected Budget SFY 2020	\$72,440
Projected Budget SFY 2019	\$0
Budget Amount SFY 2018	\$0
Adjusted Budget Amount SFY 2018	\$43,355
Actual Cost SFY 2018	(See Addendum Sept. 2018)
Prior to SFY 2018 Actual Cost	\$26,975

TR201725 – USGS Scan of Gasconade River Bridges—Completed

Project Type: Contract Research

MoDOT Contact: Bill Stone

Total Contract Amount: \$54,600

Contract Period: 6/1/2017 to 9/30/2017

Contract Investigator: USGS

Funding: SPR 80%, State 20%

Project Description and Objectives:

During the spring of 2017 Missouri had a flooding event that closed hundreds of roads. After a flooding event checking the safety of bridges for scouring can be challenging. Of particular concern were several bridges along the Gasconade River in mid-Missouri. USGS used some of their scanning technology to quickly deploy to these locations to determine if there was any undermining of the bridge foundations.

Proposed Activities for SFY 2019:

This project was completed in State Fiscal Year 2018.

SFY 2018 Accomplishments:

The data for the bathymetric surveys at the six bridge sites was approved and released by USGS on October 3, 2017. The information was posted on their website. This project has been completed.

Financials**Amount**

Projected Budget SFY 2019	\$0
Budget Amount SFY 2018	\$0
Actual Cost SFY 2018	(See Addendum Sept. 2018)
Prior to SFY 2018 Actual Cost	\$54,600

TR201801 - Library Support Contract (2018-2019)

Project Type: Contract Research

MoDOT Contact: Bill Stone

Total Contract Amount: \$196,428

Contract Period: 7/1/2017 to 6/30/2019

Contract Investigator: Charles Nemmers

Funding: SPR 80%, State 20%

Project Description and Objectives:

The demand for information services has increased as more MoDOT users are realizing the timely, diverse and high quality information they receive using the services of the current librarian. The major objective of this project is to provide library, research and reference support services for MoDOT. University of Missouri-Columbia will provide the services of a Master of Library Science (MLS) librarian who will work 40 hours per week and will be located at the Secretary of State's State Library and MoDOT in Jefferson City.

Proposed Activities for SFY 2019:

The librarian will continue to provide reference and research support services to MoDOT employees. Other services include circulation, cataloging, collection management (which includes digital repositories) & maintenance, marketing & outreach in addition to website content creation. Ongoing activities include coordinating and collaborating with the Missouri State Library.

SFY 2018 Accomplishments:

For 2018 Q1-Q3, the librarian answered a total of 101 requests, 65 short reference questions and 36 literature searches (SFY estimate 115 total). A total of 10,719 print and electronic library items were circulated or accessed (SFY estimate 13,000). 114 new items were added to the library collection (SFY estimate 200). 38 Contract Research Reports were posted to the Innovation Library (SFY estimate 43). 9 items were borrowed from other libraries (estimate 12 for SFY) and 8 items were lent to other libraries (estimate 11 for SFY). The librarian closed out TPF-5(237) Pooled Fund project and is working with peers to advocate for another state's sponsorship of a successor Pooled Fund. Continue to serve as ombudsman for state DOT libraries regarding AASTHO e-publications issues; co-lead for AASHTO RAC CCTF TKN Working Group; member of National Transportation Knowledge Network (NTKN) Coordinating Council; working on numerous collaborative projects with Midwest Transportation Knowledge Network (MTKN) members; and developed Right Transportation Solutions site in Sharepoint to assist Design Division with tracking invoices and survey results.

Financials

	<u>Amount</u>
Projected Budget SFY 2020	\$3,494
Projected Budget SFY 2019	\$100,000
Budget Amount SFY 2018	\$90,000
Adjusted Budget Amount SFY 2018	\$92,934
Actual Cost SFY 2018	(See Addendum Sept. 2018)
Prior to SFY 2018 Actual Cost	\$0

TR201802 - IC-IR Consultant Contract-Phase 2—Completed

Project Type: Contract Research

MoDOT Contact: Bill Stone

Total Contract Amount: \$53,092

Contract Period: 8/1/17 to 4/30/18

Contract Investigator: George Chang

Funding: SPR 80%, State 20%

Project Description and Objectives:

This project was added to include consultant support for 3 additional MoDOT projects that were included as part of the Accelerated Innovation and Deployment (AID) Grant. Project TR201716 (S0522011) is

funded by the AID Grant and provided support for the original 10 projects that were funded by the grant. The consultant has developed lead contractor Intelligent Compaction (IC) and Infrared (IR) training for each of the MoDOT projects in 2017 that incorporated IC-IR. The project will provide data and field support for each of the 13 IC-IR MoDOT Asphalt Projects constructed in 2017.

Proposed Activities for SFY 2019:

This project was completed in State Fiscal Year 2018.

SFY 2018 Accomplishments:

The Final reports for each of the 13 projects were completed during the quarter. An industry meeting was conducted in Jefferson City on December 3, 2017. The purpose of this meeting was to share progress to date on the Intelligent Compaction and Infrared Scanning program in Missouri. It provided MoDOT to present the results overall of the 13 projects and give vision of where MoDOT is headed with the program. Also, a key element of the meeting was to gather feedback from the Missouri contractors, vendors, roller manufacturers and other staff that were involved with IC-IR in Missouri during the past construction season. A meeting was conducted on December 14, 2017 in Jefferson City to present the results from the Intelligent Compaction and Infrared Scanning program to the Chief Engineer and the State Construction Materials Engineer and his assistant. The final reports for both TR201716 and TR201802 have been completed and are published on the Innovation Library. There was also another report developed from the IC-IR work. This report was for the Accelerated Innovation and Deployment (AID) award it is also published on the Innovation Library. The last IC-IR training session was conducted at the Central District Office on March 14, 2018. This completes the IC-IR training requirements for these contracts.

Financials

	<u>Amount</u>
Projected Budget SFY 2019	\$0
Budget Amount SFY 2018	\$53,092
Actual Cost SFY 2018	(See Addendum Sept. 2018)
Prior to SFY 2018 Actual Cost	\$0

TR201803 - Facebook Surveys—RTS Fiscal Year 2018—Completed

Project Type: Contract Research

MoDOT Contact: Jen Harper

Total Contract Amount: \$31,500

Contract Period: 8/1/17 to 6/30/18

Contract Investigator: Facebook

Funding: SPR 80%, State 20%

Project Description and Objectives:

For several years MoDOT has been conducting a project which a contract was negotiated with a professional survey company to conduct a survey entitled “Right Transportation Solutions”. It conducted a public survey regarding multiple projects across the state to gauge the public’s reaction to those projects. With this project MoDOT is looking to conduct a similar survey, however use Facebook as the survey mechanism. A pilot project was conducted in 2017 and was successful so for fiscal year 2018 all district surveys will be conducted through Facebook.

Proposed Activities for SFY 2019:

A new project number (TR201903) has been set up for the Fiscal Year 2019 survey so no work will take place in 2019 for this project.

SFY 2018 Accomplishments:

All of the districts utilized Facebook to conduct the Right Transportation Survey this past year. Invoices were received and processed. Results from the surveys were published in the January 2018 Tracker. The number of responses received was: Northwest (84), Northeast (94), Kansas City (71), Central (92), St. Louis (54), Southwest (87), and Southeast (78). More than 2,350 comments were received. This project is closed.

Financials

	<u>Amount</u>
Projected Budget SFY 2019	\$0
Budget Amount SFY 2018	\$31,500
Actual Cost SFY 2018	(See Addendum Sept. 2018)
Prior to SFY 2018 Actual Cost	\$0

TR201804 - Field Implementation of Rubberized Chip Seal

Project Type: Contract Research

MoDOT Contact: Bill Stone

Total Contract Amount: \$54,167

Contract Period: 9/15/2017 to 12/31/2018

Contract Investigator: Mohamed ElGawady

Funding: SPR 80%, State 20%

Project Description and Objectives:

The Central District Maintenance Division was interested in placement of a rubberized chip seal to evaluate its performance. The Missouri University of Science and Technology (Missouri S&T) had received a grant from Missouri Department of Natural Resources to study the product. This MoDOT research project will monitor the performance of an experimental section constructed out of rubberized chip seal. The site selected was Route CC in Phelps County just south of Rolla.

Proposed Activities for SFY 2019:

The remainder of the laboratory Vialit tests (Task 7) will be completed by performing the test on the four sizes of crumb rubber and three sizes of trap rock. The laboratory Pennsylvania Test (Task 8) will be completed along with the field investigation (Task 11) which is the monthly sand patch field investigation. The final report and all deliverables for the project are on track to be completed in Fiscal Year 2019.

SFY 2018 Accomplishments:

The agreement for the project was executed on August 31, 2017. The rubberized chip seal was placed on Route CC in Phelps County in September 2017. Friction testing was conducted on the roadway for the different test sections and a control section on October 16, 2017.

Financials

	<u>Amount</u>
Projected Budget SFY 2019	\$16,967
Budget Amount SFY 2018	\$37,200
Actual Cost SFY 2018	(See Addendum Sept. 2018)
Prior to SFY 2018 Actual Cost	\$0

TR201806 - Performance-Based Specifications of Fiber-Reinforced Concrete to Enhance Performance and Reduce Steel-Reinforcement in Structural Members

Project Type: Contract Research

MoDOT Contact: Bill Stone

Total Contract Amount: \$89,999

Contract Period: 12/1/2017 to 1/31/2019

Contract Investigator: Kamal Khayat

Funding: SPR 80%, State 20%

Project Description and Objectives:

The project aims at evaluating the combined effect of calcium oxide-based EA (CaO-based), LWA, and fiber content under different moist-curing regimes on restrained shrinkage, mechanical properties, frost durability, transport properties, and corrosion resistance of Eco high-performance concrete (Eco-HPC) targeted for bridge applications (Eco-Bridge-Crete). It has also been recognized that the FR-SWC can be produced using EA and various types of fibers. Proper use of fibers was shown to increase flexural strength and flexural toughness in monolith beams cast using FRC vs. those cast using regular concrete. As such, the incorporation of fibers can replace a portion of the steel reinforcement bars and obtaining same flexural strength, and even associated improve in toughness and crack resistance for the enhancement of resilience.

Proposed Activities for SFY 2019:

The project was in early stages to date, so majority of testing will be during Fiscal Year 2019.

SFY 2018 Accomplishments:

The Task Order was executed on December 11, 2017. The project is in the early stages of testing. This includes material performance optimization (Task 1), cutting and bending of rebars and building the steel cages along with installing the strain gauges for evaluation of early mixes. Approximately 25% of the project was completed by the end of fiscal year 2018.

Financials

	<u>Amount</u>
Projected Budget SFY 2020	\$44,793
Projected Budget SFY 2019	\$45,206
Budget Amount SFY 2018	\$0
Actual Cost SFY 2018	(See Addendum Sept. 2018)
Prior to SFY 2018 Actual Cost	\$0

TR201807 - Understanding and Improving Heterogeneous, Modern Recycled Asphalt Mixes**Project Type:** Contract Research**MoDOT Contact:** Bill Stone**Total Contract Amount:** \$543,534**Contract Period:** 3/1/2018 to 4/30/2020**Contract Investigator:** Bill Butler**Funding:** SPR 80%, State 20%**Project Description and Objectives:**

The research goal will be to focus on high-type mixes (MoDOT Sec. 403 mixes), although findings will provide useful insight for all asphalt mixes used in Missouri. A comprehensive suite of binder and mixture tests will be carried out in order to link mix designs and materials to eventual field performance (rutting, cracking, and moisture damage predictions). This project will allow us to evaluate the potential performance of modern crumb rubber mixes, RAP and RAS mixtures, and rejuvenators in Missouri.

Proposed Activities for SFY 2019:

Project just got underway contractually before the end of the fiscal year, therefore the literature review, material sampling and preparation along with some Performance Testing are anticipated during State Fiscal Year 2019.

SFY 2018 Accomplishments:

The Task Order was executed on March 2, 2018. The literature review began along with early discussions of projects to sample.

Financials

	<u>Amount</u>
Projected Budget SFY 2020	\$202,963
Projected Budget SFY 2019	\$242,000
Budget Amount SFY 2018	\$98,571
Actual Cost SFY 2018	(See Addendum Sept. 2018)
Prior to SFY 2018 Actual Cost	\$0

TR201808 - UAS State of the Practice for Transportation**Project Type:** Contract Research**MoDOT Contact:** Jen Harper**Total Contract Amount:** \$20,000.00**Contract Period:** 2/20/2018 to 5/31/2018**Contract Investigator:** Joe Pestka**Funding:** SPR 80%, State 20%**Project Description and Objectives:**

The project objective is to identify key strategies, activities, and best practices utilized by five states that are leading the nation in UAS adoption. This study will utilize action research methodologies, which will include primarily qualitative research techniques – phone interviews, focus group discussions, and literature review. This study will involve broad participation from UAS stakeholders, including operators, manufacturers, UAS test sites, the FAA and state agencies.

Proposed Activities for SFY 2019:

The project was completed in State Fiscal Year 2018.

SFY 2018 Accomplishments:

The contract was signed on February 21, 2018. This is a quick project and was completed during the 4th quarter. The draft final report was received and accepted and the final invoice paid. This project is completed.

Financials

	<u>Amount</u>
Projected Budget SFY 2019	\$0
Budget Amount SFY 2018	\$20,000
Actual Cost SFY 2018	(See Addendum Sept. 2018)
Prior to SFY 2018 Actual Cost	\$0

TR201809 - Assessment and Repair of Corroded Steel H-Piles

Project Type: Contract Research

MoDOT Contact: Bill Stone

Total Contract Amount: \$227,498

Contract Period: 12/1/2017 to 7/1/2020

Contract Investigator: Mohamed ElGawady

Funding: SPR 80%, State 20%

Project Description and Objectives:

The overarching objective of this research is to develop efficient, accelerated, and sustainable techniques for repairing H-piles to restore their initial axial capacities. The corrosion will be simulated by milling the flanges and/or webs of the H-piles. For a severely corroded pile, the reduced section dimensions will be accompanied by a void in the web and/or cuts in the flanges. The piles will be repaired using pultruded fiber reinforced polymer (FRP) sections, ultra-high strength concrete (UHPC) sections, and FRP wrapping.

Proposed Activities for SFY 2019:

The following tasks are scheduled to be conducted during Fiscal Year 2019:

- Task 6-FRP Wrapping
- Task 7-Full-Scale pile testing
- Task 8-Design Guidelines.

SFY 2018 Accomplishments:

The Task Order was executed on December 12, 2017. The literature review is complete. The test setup is 60% completed. Corrosion sections were formed in few specimens. Extensive finite element models were developed. The models were calibrated vs. experimental work from TXDOT. Parametric studies were developed. Finite element models of the FRP wrapping was completed which allowed the PI to determine the experimental parameters and their ranges. The bridge division has included Job Special Provision (JSP) in “Section B: Storage of Existing Piling Being Removed” in MoDOT Projects to request districts to contact the Assistant State Bridge Engineer once a pile is removed. A project on Route 291 in KC has offered some existing piling from a project. The evaluation of these removed piles is being evaluated to determine if they are a good candidate for the study.

Financials

	<u>Amount</u>
Projected Budget SFY 2021	\$17,500
Projected Budget SFY 2020	\$83,210
Projected Budget SFY 2019	\$83,211
Budget Amount SFY 2018	\$43,577
Actual Cost SFY 2018	(See Addendum Sept. 2018)
Prior to SFY 2018 Actual Cost	\$0

TR201811 - Support for Balanced Asphalt Mixture Design Specification Development in Missouri**Project Type:** Contract Research**MoDOT Contact:** Bill Stone**Total Contract Amount:** \$283,609**Contract Period:** 5/18/2017 to 6/30/2020**Contract Investigator:** Bill Butler**Funding:** SPR 80%, State 20%**Project Description and Objectives:**

The project is being developed to mix performance tests to supplement volumetric mix design and the PG binder specification, and there is currently a national movement to rectify that shortcoming. Advances in fundamental and torture-type asphalt mixture tests, particularly those related to crack control, have become more prevalent in the past decade. However, states are just now beginning to implement these new tests into specifications for asphalt mixture design, control, and acceptance. The first step in this path usually involves the introduction of tests for the mixture design stage.

Proposed Activities for SFY 2019:

A literature review will be conducted. In consultation with MoDOT and MAPA a test matrix of laboratory and field projects/mixtures will be created. The goal will be to focus on high-type mixes (MODOT 403 mixes). These selected mixes will be have performance test conducted to link mix performance test results to observed field performance (rutting, cracking, moisture damage overall condition and ride quality).

SFY 2018 Accomplishments:

The Task Order was executed on March 17, 2018. The details of the work plan and scheduling of the project will be discussed at the Kick-off Meeting, which is still to be scheduled at the time of this writing.

Financials

	<u>Amount</u>
Projected Budget SFY 2020	\$147,692
Projected Budget SFY 2019	\$135,917
Budget Amount SFY 2018	\$0
Actual Cost SFY 2018	(See Addendum Sept. 2018)
Prior to SFY 2018 Actual Cost	\$0

TR201812 - Transportation Infrastructure Conference**Project Type:** Contract Research**MoDOT Contact:** Bill Stone**Total Contract Amount:** \$6,000**Contract Period:** 7/1/17 to 6/30/18**Contract Investigator:** Missouri S&T**Funding:** SPR 80%, State 20%**Project Description and Objectives:**

The Transportation Infrastructure Conference is an annual conference initiated by the Missouri University of Science and Technology. It is conducted in the fall/winter of the year to highlight research projects and activities.

Proposed Activities for SFY 2019:

MoDOT again plans to co-sponsor this event in the amount of \$3,000. It is anticipated that the event will be held at Missouri S&T in the month of December 2018

SFY 2018 Accomplishments:

The Transportation Infrastructure Conference was held on December 8, 2018 at the Missouri University of Science and Technology (Missouri S&T). MoDOT is a co-sponsor with Missouri S&T for this event. The invoice for the co-sponsorship was processed in December 2017 in the amount of \$3,000.

Financials

	<u>Amount</u>
Projected Budget SFY 2019	\$3,000
Budget Amount SFY 2018	\$3,000
Actual Cost SFY 2018	(See Addendum Sept. 2018)
Prior to SFY 2018 Actual Cost	\$0

TR201813 - Leader-Follower TMA System**Project Type:** Contract Research**MoDOT Contact:** Jen Harper**Total Contract Amount:** \$549,921**Contract Period:** 3/5/2018 to 3/16/2020**Contract Investigator:** Jay Rhoades**Funding:** SPR 80%, State 20%**Project Description and Objectives:**

MoDOT's mobile and slow moving operations, such as striping, sweeping, bridge flushing and pothole patching, are critical for efficient and safe operation of the highway transportation system. MoDOT's slow moving operations have been crashed into over 80 times since 2013 resulting in many injuries to MoDOT employees. The objective of this RFP is to provide a NCHRP 350 Level 3 compliant Leader-Follower TMA System capable of operating a driverless rear advanced warning truck in mobile highway operations as described in Traffic Application TA-35a. The system shall consist of a Lead Truck (LT) and a Rear Advanced Warning Truck called the Follow Truck (FT). The goal is to avoid operator injury by eliminating the need for a human operator in the FT.

Proposed Activities for SFY 2019:

A bulk of the work will take place in Fiscal Year 2019. The Leader-Follower system will undergo the retrofit and initial testing and troubleshooting at the facility in Florida before the trucks are shipped back to Missouri in early 2019. Once back in Missouri the research team will provide training to MoDOT staff and testing and evaluation will occur in a controlled environment. A required 32 hours of continuous operation without failure or worker interference is required before moving to a live work zone. Testing in a live mobile work zone will continue into Fiscal Year 2020.

SFY 2018 Accomplishments:

The RFP was posted on January 5, 2018 and proposals were received on February 6th. The technical advisory team met on February 14th and selected the team from Microsystems. The contract was executed on March 5, 2018. The team hosted a kick off meeting on March 30th. The trucks were delivered to Florida in April and work began on modifications for the autonomous features. One of the project managers traveled to Missouri in April to meet with Missouri S&T staff and students to begin coordination of their portion of the project. While there the project manager gave a presentation to students at the university.

Financials

	<u>Amount</u>
Projected Budget SFY 2020	\$357,449
Projected Budget SFY 2019	\$192,472
Budget Amount SFY 2018	\$0
Actual Cost SFY 2018	(See Addendum Sept. 2018)
Prior to SFY 2018 Actual Cost	\$0

TR201814 - Leader-Follower TMA System Misc. Expenses

Project Type: Contract Research

MoDOT Contact: Jen Harper

Total Contract Amount: \$30,000

Contract Period: 3/5/2018 to 3/16/2020

Contract Investigator: N/A

Funding: SPR 80%, State 20%

Project Description and Objectives:

This project is set up for the miscellaneous expenses for the Leader-Follower truck project that are not part of the contract. Items such as shipping of the trucks to the contractor would fall under this project number.

Proposed Activities for SFY 2019:

It is anticipated that there will be an additional payment for shipping the trucks back to Missouri in early 2019. It is unclear if additional miscellaneous expenses will be required.

SFY 2018 Accomplishments:

Payment for shipping of the trucks took place in April, 2018.

Financials

	<u>Amount</u>
Projected Budget SFY 2020	\$6,100
Projected Budget SFY 2019	\$16,100
Budget Amount SFY 2018	\$7,800
Actual Cost SFY 2018	(See Addendum Sept. 2018)
Prior to SFY 2018 Actual Cost	\$0

TR201815 - TITAN - An Interactive Web-based Platform for Transportation Data InTegration and ANalytics**Project Type:** Contract Research**MoDOT Contact:** Jen Harper**Total Contract Amount:** \$24,992**Contract Period:** 6/1/2018 to 5/31/2019**Contract Investigator:** Carlos Sun**Funding:** SPR 80%, State 20%**Project Description and Objectives:**

The rate of transportation data collection is poised to increase exponentially with mobile computing, community-based sensing and vehicle-to-vehicle and vehicle-to-infrastructure communications. The research team will design a prototype interactive, web-based platform that will assist decision makers at MoDOT to seamlessly integrate and analyze transportation datasets. The developed system will take advantage of recent advances in big data analytics and user-centered data visualization to improve the speed of the platform and facilitate the storage and integration of very large, structure and unstructured data across different private and public databases. TITAN will also provide for users quick access to the integrated datasets via a non-programmatic, interactive web interface.

Proposed Activities for SFY 2019:

All work will take place in Fiscal Year 2019. The final deliverable will be a prototype for MoDOT staff to interact with the platform.

SFY 2018 Accomplishments:

The contract was executed April 11, 2018 with a start date of June 1, 2018. At the time of this report no work has taken place yet.

Financials

	<u>Amount</u>
Projected Budget SFY 2019	\$24,992
Budget Amount SFY 2018	\$0
Actual Cost SFY 2018	(See Addendum Sept. 2018)
Prior to SFY 2018 Actual Cost	\$0

TR201903 - Facebook Surveys—RTS Fiscal Year 2019**Project Type:** Contract Research**MoDOT Contact:** Jen Harper**Total Contract Amount:** \$11,370**Contract Period:** 7/1/2018 to 6/30/19**Contract Investigator:** Facebook**Funding:** SPR 80%, State 20%

Project Description and Objectives:

For several years MoDOT has been conducting a project which a contract was negotiated with a professional survey company to conduct a survey entitled “Right Transportation Solutions”. It conducted a public survey regarding multiple projects across the state to gauge the public’s reaction to those projects. With this project MoDOT is looking to conduct a similar survey, however use Facebook as the survey mechanism. A pilot project was conducted in 2017 and was successful so starting in fiscal year 2018 all district surveys have been conducted through Facebook.

Proposed Activities for SFY 2019:

All of the districts will utilize Facebook to conduct the Right Transportation Survey in Fiscal Year 2019. Projects will be surveyed during the first two quarters so they can be reported on in the January 2019 TRACKER.

SFY 2018 Accomplishments:

This project will begin in Fiscal Year 2019.

Financials

	<u>Amount</u>
Projected Budget SFY 2019	\$11,370
Budget Amount SFY 2018	\$0
Actual Cost SFY 2018	(See Addendum Sept. 2018)
Prior to SFY 2018 Actual Cost	\$0

MoDOT Lead Pooled Fund Studies

Solicitation 1470 - Developing Implementation Strategies for Risk Based Inspection (RBI)

Project Type: Pooled Funds

MoDOT Contact: Bill Stone

MoDOT Total Commitment: \$100,000

Contract Period: 7/1/2018 to 6/30/2022

Contract Investigator: Glenn Washer – University of Missouri-Columbia

Funding: SPR 100%

Project Description and Objectives:

The research envisions developing a handbook for implementation of RBI practices that will provide a resource to participating states, presenting examples and case studies that define suitable attributes and characteristic for RBI. Workshops and training will be provided to participating states to assist with implementation of RBI, and tools will be developed to assist with future implementation of the RBI technology. Analysis of the bridge inventory to evaluate risk-based strategies will provide data for better asset management.

The following are the objectives of the pooled fund:

1. Study the implementation of RBI processes within State DOT programs
 - a. Develop a paradigm for conducting risk-based inspection analysis through training and workshops with participating states.
 - b. Develop a handbook for implementation of RBI describing key processes, key attributes and scoring methodologies for implementation
 - c. Develop strategies for using data-driven risk analysis within the RBI framework
 - d. Develop methodologies for supporting preservation activities within an RBI framework
2. Study the implementation of technologies to support RBI:
 - a. Reliability of inspection technologies and implementation of NDE to support RBI.

Financials

	<u>Amount</u>
Committed Funds SFY 2019	\$50,000
Committed Funds SFY 2018	\$0
Transferred Funds SFY 2018	\$0

Solicitation TBD – Traffic Disruption-free Bridge Inspection Initiative with Robotic Systems:

Project Type: Pooled Funds

MoDOT Contact: Bill Stone

MoDOT Total Commitment: \$150,000

Contract Period: 7/01/2018 to 6/30/2023

Contract Investigator: Dr. Genda Chen – Missouri University of Science and Technology

Funding: SPR 100%

Project Description and Objectives:

The INSPIRE University Transportation Center (<https://inspire-utc.mst.edu>) at Missouri University of Science and Technology was awarded in December of 2016 by the U.S. Department of Transportation. The center is focused on the development of advanced technologies to aid in bridge inspection and

maintenance. Specifically, structural crawlers and unmanned aerial vehicles (UAVs) will provide a mobile platform for in-depth inspection of elevated bridges. Microwave and hyperspectral images will be developed to qualitatively or quantitatively assess concrete delamination and steel corrosion of reinforced concrete (RC) bridges.

The goals of this pooled-fund initiative are to engage closely with several state departments of transportation (DOTs) in the early stage of technology development at the INSPIRE University Transportation Center, and leverage the center resources to develop case studies, protocols, and guidelines that can be adopted by state DOTs for bridge inspection without adversely impacting traffic. The initiative involves the integration, field demonstration and documentation of a robotic system of structural crawlers, UAVs, NDE devices, sensors, and data analytics. Depending on the interest of participating DOTs, the objectives of this initiative include, but are not limited to:

- Development of inspection protocols for various types of bridges with the robotic system integrated into current practice.
- Comparison and correlation of bridge deck inspections from above and underneath decks to understand the reliability of traffic disruption-free bridge inspection from underneath.
- Design and technical guidelines of measurement devices on a robotic platform for the detection of surface and internal damage/deterioration in structural members, and for the change in lateral support of foundations.
- Data fusion and analytics of measurements taken from various imaging and sensing systems for consistency and reliability.

Financials

	<u>Amount</u>
Committed Funds SFY 2019	\$25,000
Committed Funds SFY 2018	\$0
Transferred Funds SFY 2018	\$0

Pooled Fund Studies

(Pooled Fund Project contributions are not taken out of the RDS funding category)

TPF-5(193)-Midwest States Pooled Fund Crash Test Program

Project Type: Pooled Funds

MoDOT Contact: Bill Stone

MoDOT Total Commitment: \$705,000

Contract Period: 11/19/2008 to 6/30/2019

Contract Investigator: Nebraska DOT

Funding: SPR 100%

Project Description and Objectives:

This project is continuation of work done under project SPR-3(017), in which MoDOT has been a participant since 1991. The study has proved to be successful to this point and will remain active under the new project number. The purpose of the project is to crash test highway roadside appurtenances to assure they meet criteria established nationally. For more information, please refer to the Midwest Roadside Safety website: www.mwrsf.unl.edu

Financials

Committed Funds SFY 2019

Committed Funds SFY 2018

Transferred Funds SFY 2018

Amount

\$65,000

\$65,000

\$65,000

TPF-5(255)-Highway Safety Manual

Project Type: Pooled Funds

MoDOT Contact: Jen Harper

MoDOT Total Commitment: \$180,000

Contract Period: 1/19/2012 to 12/31/2019

Contract Investigator: FHWA

Funding: SPR 100%

Project Description and Objectives:

The Highway Safety Manual (HSM), 1st Edition, was published by AASHTO in 2010. The HSM provides the best factual information and tools in a useful form to facilitate roadway planning, design, operations, and maintenance decisions based on precise consideration of their safety consequences. The AASHTO Standing Committee on Highway Traffic Safety has established a goal to institutionalize the AASHTO Highway Safety Manual (HSM) and its associated analytical tools to make data-driven decisions, advance the science of safety, and to ultimately reduce fatalities and serious injuries. The objectives of the study are to advance ongoing efforts by lead states to implement the HSM, and to expand implementation to all states.

Financials

Committed Funds SFY 2019

Committed Funds SFY 2018

Transferred Funds SFY 2018

Amount

\$20,000

\$20,000

\$20,000

TPF-5(269)-Unbonded Concrete Overlays Pooled Fund**Project Type:** Pooled Funds**MoDOT Contact:** Jen Harper**MoDOT Total Commitment:** \$60,000**Contract Period:** 6/17/2013 to 10/31/2018**Contract Investigator:** Minnesota DOT**Funding:** SPR 100%**Project Description and Objectives:**

One pavement rehabilitation option that has been gaining popularity in the U.S. recently is unbonded concrete overlays of existing concrete or composite pavements (UCOCP). While thicker (>7") unbonded concrete overlays have performed very well in many states, current economic restrictions, as well as an interest in using less materials (sustainability), are guiding agencies toward optimizing concrete overlays. This can be done by making the best use of the existing pavement structure and designing a cost effective interlayer and concrete overlay. The primary purpose of this project is to create a unified national design guide for unbonded concrete overlays of existing concrete and composite pavements. There are sufficient funds still in the pooled fund, therefore no additional commitments are necessary.

Financials**Amount**

Committed Funds SFY 2019

\$0

Committed Funds SFY 2018

\$0

Transferred Funds SFY 2018

\$0

TPF-5(273)/Solicitation 1472-Institute for Trade and Transportation Studies - ITTS**Project Type:** Pooled Funds**MoDOT Contact:** Bill Stone**MoDOT Total Commitment:** \$238,800**Contract Period:** 12/1/2012 to 6/30/2018**Contract Investigator:** Mississippi Department of Transportation and Development**Funding:** SPR 100%**Project Description and Objectives:**

The Southeastern Transportation Alliance was formed in 1996 for the purpose of undertaking the Latin America Trade and Transportation Study (LATTS). The premise of the study was the recognition that Latin America is poised for growth and this presents huge trade potential for southeastern states. Following the completion of LATTS (Phase I) in March 2001, the study was taken to the next level under the name LATTS II. LATTS II was a two-year analysis of the critical infrastructure needs identified in LATTS (Phase I). To continue the original study initiatives, the remaining Alliance states decided to form an independent entity entitled the Institute for Trade and Transportation Studies (ITTS). The purpose of ITTS is to estimate trade volumes with Latin America and other international trade, evaluate infrastructure investments needed to support growth in international trade, and develop strategies to guide infrastructure investments. The Mississippi Department of Transportation will become the lead state under solicitation 1472. The total commitment amount reflects all of the ITTS pooled fund amounts for the previous pooled fund and new solicitation.

<u>Financials</u>	<u>Amount</u>
Committed Funds SFY 2019	\$39,800
Committed Funds SFY 2018	\$39,800
Transferred Funds SFY 2018	\$39,800

TPF-5(290)-Aurora Program

Project Type: Pooled Funds
MoDOT Contact: Bill Stone
MoDOT Total Commitment: \$25,000
Contract Period: 1/1/2013 to 5/31/2019
Contract Investigator: Iowa DOT
Funding: SPR 100%

Project Description and Objectives:

The Aurora Program is a consortium of public agencies focused on collaborative research, evaluation, and deployment of technologies for detailed road weather monitoring and forecasting. Members seek to implement advanced road weather information systems (RWIS) that fully integrate state-of-the-art roadway and weather forecasting technologies with coordinated, multi-agency weather monitoring infrastructures; ultimately lessening adverse impacts of inclement weather.

<u>Financials</u>	<u>Amount</u>
Committed Funds SFY 2019	\$25,000
Committed Funds SFY 2018	\$0
Transferred Funds SFY 2018	\$0

TPF-5(293)-Mid-America Freight Coalition-II

Project Type: Pooled Funds
MoDOT Contact: Bill Stone
MoDOT Total Commitment: \$100,000
Contract Period: 11/6/2013 to 12/31/2018
Contract Investigator: Wisconsin DOT
Funding: SPR 100%

Project Description and Objectives:

The industries and farms of the Mississippi Valley region can compete in the marketplace only if their products can move reliably, safely and at reasonable cost to market. Growing congestion threatens the sustainability of this freight movement. The people of the region are dependent upon farms and industries for their livelihoods and their economic quality of life depends on the flow of goods to our markets. The Mississippi Valley Freight Coalition (MVFC) was created to protect and support the economic wellbeing of the industries, farms and people of the region by keeping the products of those industries, farms and people flowing to markets reliably, safely, and efficiently. This project is a continuation of Pooled Fund TPF-5(156).

<u>Financials</u>	<u>Amount</u>
Committed Funds SFY 2019	TBD
Committed Funds SFY 2018	\$25,000
Transferred Funds SFY 2018	\$25,000

TPF-5(295)-Smart Work Zone Deployment Initiatives (SWZDI)

Project Type: Pooled Funds
MoDOT Contact: Bill Stone
MoDOT Total Commitment: \$300,000
Contract Period: 5/15/2014 to 6/1/2019
Contract Investigator: Iowa DOT
Funding: SPR 100%

Project Description and Objectives:

The Midwest Smart Work Zone Deployment Initiative (MwSWZDI) was initiated in 1999 as a Pooled Fund Study intended to coordinate and promote research related to safety and mobility in highway work zones. The Iowa DOT has been the lead state since 2004. The program is an ongoing cooperative effort between State Departments of Transportation, universities, and industry. Commercial products are provided by private vendors for evaluation, although this is not the only focus of contracted projects. State DOTs provide funds, prioritize products with respect to the anticipated benefits to their construction and maintenance activities, and cooperate with researchers to identify test sites and conduct the evaluations.

<u>Financials</u>	<u>Amount</u>
Committed Funds SFY 2019	\$50,000
Committed Funds SFY 2018	\$50,000
Transferred Funds SFY 2018	\$50,000

TPF-5(301)-Support Services for Peer Exchanges

Project Type: Pooled Funds
MoDOT Contact: Bill Stone
MoDOT Total Commitment: \$22,254 (estimated)
Contract Period: 10/1/14 to 6/30/19
Contract Investigator: Oregon
Funding: SPR 100%

Project Description and Objectives:

The Peer exchange has been a requirement for state RD&T programs since 1998 and it has proven to be a useful and effective tool for improving research program management. However, for many states the most difficult aspect of hosting a peer exchange is logistics and procurement. This Peer Exchange Project is intended to provide Research Programs with the option to procure services to help with the logistical and administrative aspects of organizing and holding an RD&T Peer Exchange, as described under 23 CFR 420.203. Doing so will allow Research Programs to focus on the content of their peer exchange. Each state makes a contribution amount of around \$7,000 but an actual transfer amount is determined after the logistics are finalized and actual costs are determined. MoDOT has not participated in this pooled fund in past years; Fiscal Year 2018 was the first year of participation.

Financials

Committed Funds SFY 2019
 Committed Funds SFY 2018
 Transferred Funds SFY 2018

Amount

\$22,254 (estimate)
 \$0
 \$0

TPF-5(305)-Regional and National Implementation and Coordination of ME Design

Project Type: Pooled Funds
MoDOT Contact: Bill Stone
MoDOT Total Commitment: \$50,000
Contract Period: 1/1/15 to 12/30/18
Contract Investigator: Iowa DOT
Funding: SPR 100%

Project Description and Objectives:

The focus of this pooled fund project will be to provide peer exchanges and the AASHTO National Users Group meeting. The meetings are to support State DOT and Canadian province implementation of ME Design procedures by (1) sharing information between, (2) identifying issues at the local/regional level with regard to implementation, (3) identifying needs or areas that still need to be researched relative to the MEPDG, and (4) organizing implementation efforts on a regional and National basis. The four peer exchanges will be limited to participation by governmental agencies, while the AASHTO Users group meeting will be open to industry representatives, academics, consultants, and others interested in ME Design.

Financials

Committed Funds SFY 2019
 Committed Funds SFY 2018
 Transferred Funds SFY 2018

Amount

\$10,000
 \$10,000
 \$10,000

TPF-5(313)-Technology Transfer Concrete Consortium (TTCC)

Project Type: Pooled Funds
MoDOT Contact: Jen Harper
MoDOT Total Commitment: \$40,000
Contract Period: 2/5/2015 to 8/31/2020
Contract Investigator: Iowa State
Funding: SPR 100%

Project Description and Objectives:

Increasingly, state DOTs are challenged to design and build longer life concrete pavements that result in higher levels of user satisfaction. In order to foster new technologies and practices, experts from state DOTs, FHWA, academia and industry must collaborate to identify and examine new concrete pavement research initiatives. The Technology Transfer Concrete Consortium (TTCC) is to establish a pooled fund for state representatives to continue collaborative efforts begun in TPF-5(066) Materials and Construction Optimization. TTCC will provide new developments in concrete paving leading to implementation of new technologies and longer life pavements through the use of innovative testing, technology transfer, and construction optimization technologies and practices.

<u>Financials</u>	<u>Amount</u>
Committed Funds SFY 2019	\$8,000
Committed Funds SFY 2018	\$8,000
Transferred Funds SFY 2018	\$8,000

TPF-5(316)-Traffic Control Device (TCD) Consortium (Traffic)

Project Type: Pooled Funds
MoDOT Contact: Jen Harper
MoDOT Total Commitment: \$100,000
Contract Period: 1/14/2015 to 1/14/2020
Contract Investigator: FHWA
Funding: SPR 100%

Project Description and Objectives:

The Traffic Control Device Consortium will focus on systematic evaluation of novel TCDs, employing a consistent process that addresses human factors and operations issues for each TCD idea and by providing local and state agencies a quicker response to new technologies with the right assessment skills and tools that will enable consistent TCD idea identification and evaluation. TCD Consortium efforts will address TCD issues identified by local and state jurisdictions, industry, and organizations and will aid in the compliance to the MUTCD rule-making process and incorporation of novel TCDs into the MUTCD. This project is a continuation of TPF-5(065).

<u>Financials</u>	<u>Amount</u>
Committed Funds SFY 2019	\$25,000
Committed Funds SFY 2018	\$25,000
Transferred Funds SFY 2018	\$25,000

TPF-5(317)-Low Cost Safety Improvements

Project Type: Pooled Funds
MoDOT Contact: Bill Stone
MoDOT Total Commitment: \$20,000
Contract Period: 2/10/2015 to 2/9/2020
Contract Investigator: FHWA
Funding: SPR 100%

Project Description and Objectives:

The Evaluation of Low Cost Safety Improvements Pooled Fund Study will encompass safety-effectiveness evaluations of priority strategies from the NCHRP Report 500 Guidebooks, Guidance for Implementation of the AASHTO Strategic Highway Safety Plan. A target of 24 strategies totaling \$6M over three years is planned, but this will vary depending on the level of support. The data for the study will be gathered from those states that implement the strategies throughout the US. The data will be collected, and evaluation studies performed. This project is a continuation of TPF-5(099).

<u>Financials</u>	<u>Amount</u>
Committed Funds SFY 2019	\$5,000
Committed Funds SFY 2018	\$5,000
Transferred Funds SFY 2018	\$5,000

TPF-5(319)-Transportation Management Center Pooled Fund Study

Project Type: Pooled Funds

MoDOT Contact: Bill Stone

MoDOT Total Commitment: \$100,000

Contract Period: 4/17/2015 to 4/16/2020

Contract Investigator: FHWA

Funding: SPR 100%

Project Description and Objectives:

The Transportation Management Center (TMC) Pooled Fund Study (PFS) serves as a forum to identify and address issues that are common among agencies that manage and operate TMCs and provides an opportunity for agencies to collectively take on those key issues and challenges. The goal of the TMC PFS is to assemble regional, state, and local transportation management agencies and the Federal Highway Administration (FHWA) to (1) identify human-centered and operational issues; (2) suggest approaches to addressing identified issues; (3) initiate and monitor projects intended to address identified issues; (4) provide guidance and recommendations and disseminate results; (5) provide leadership and coordinate with others with TMC interests; and (6) promote and facilitate technology transfer related to TMC issues nationally. This project is a continuation of TPF-2(207).

<u>Financials</u>	<u>Amount</u>
Committed Funds SFY 2019	\$25,000
Committed Funds SFY 2018	\$25,000
Transferred Funds SFY 2018	\$25,000

TPF-5(330)-No Boundaries Roadway Maintenance Practices

Project Type: Pooled Funds

MoDOT Contact: Bill Stone

MoDOT Total Commitment: \$50,000

Contract Period: 9/1/2015 to 6/30/2019

Contract Investigator: Ohio DOT

Funding: SPR 100%

Project Description and Objectives:

Through this pooled fund project, the Ohio Department of Transportation will work with other State Departments of Transportation (DOTs) to facilitate the implementation of promising non-snow and ice maintenance innovations and technologies. This project provides a forum for State DOTs to share their maintenance innovations with each other, support technology transfer activities and develop marketing and deployment plans for the implementation of selected innovations. Resources will be provided for implementing the innovations that includes travel, training and other technology transfer activities. This project is a continuation of the previous project initiated and led by the Missouri DOT TPF-5(239). It is anticipated that this consortium will become the national forum for state involvement in the technical

exchange needed for collaboration and new initiatives, and be a forum for advancing the application and benefit of research technologies. Workshops will continue to be provided for the states participating in the pooled fund project.

<u>Financials</u>	<u>Amount</u>
Committed Funds SFY 2019	\$10,000
Committed Funds SFY 2018	\$10,000
Transferred Funds SFY 2018	\$10,000

TPF-5(334) - Enhancement to the Intelligent Construction Data Management System (Veda) and Implementation

Project Type: Pooled Funds

MoDOT Contact: Bill Stone

MoDOT Total Commitment: \$100,000

Contract Period: 1/19/2016 to 6/30/2019

Contract Investigator: Minnesota DOT

Funding: SPR 100%

Project Description and Objectives:

MnDOT, in collaboration with local contractors and suppliers, is moving forward with full implementation of geo-spatial technologies such as intelligent compaction and thermal profiling (infrared imaging) as quality control tools on grading, reclamation, and asphalt paving projects. Currently, only 10 to 15 percent of the MnDOT 2014 bituminous paving contracts will utilize these technologies due to lack of needed enhancements to the ICDM-Veda for use in contract administration. The pooled fund offers participating states to be a part of development of a software interface that will provide intelligent construction data collection systems (i.e., geospatial systems such as intelligent compaction, paver-mounted thermal profiling [infrared radar technology], ground penetrating radar (GPR), and pavement smoothness/profile, etc.) gather large quantities of data each day of production activities.

<u>Financials</u>	<u>Amount</u>
Committed Funds SFY 2019	\$25,000
Committed Funds SFY 2018	\$25,000
Transferred Funds SFY 2018	\$25,000

TPF-5(341)-National Road Research Alliance

Project Type: Pooled Funds

MoDOT Contact: Bill Stone

MoDOT Total Commitment: \$600,000

Contract Period: 4/19/2016 to 6/30/2019

Contract Investigator: Minnesota

Funding: SPR 100%

Project Description and Objectives:

The need for the National Road Research Alliance (NRRA) has grown over the last several years. It is based on a number of successful efforts the Minnesota Department of Transportation (MnDOT) has achieved utilizing the MnROAD research facility. These efforts include a number of local and national

research studies, pool fund research projects, local-national-international partnerships, academic and industry involvement, Transportation Engineering and Road Research Alliance (TERRA) pooled fund, and MnROAD's 2014 Peer exchange.

Primary objectives of the National Road Research Alliance (NRRRA) are:

- Conduct structured construction, field testing and evaluation using the MnROAD cold weather facility;
- Evaluate pavement materials, equipment and methods under real-world conditions;
- Establish industry standards and develop performance measure for improving pavement performance;
- Develop and/or revise specifications and recommendations;
- Studying and promoting innovative techniques and technologies that will save agencies money, improve safety and increase efficiency;
- Supporting technology transfer by developing practical field guides, best practices, and training curriculum to promote the results of research projects

<u>Financials</u>	<u>Amount</u>
Committed Funds SFY 2019	\$150,000
Committed Funds SFY 2018	\$150,000
Transferred Funds SFY 2018	\$150,000

TPF-5(343)-Roadside Safety Research for MASH Implementation

Project Type: Pooled Funds

MoDOT Contact: Bill Stone

MoDOT Total Commitment: \$100,000

Contract Period: 1/1/2016 to 12/31/2020

Contract Investigator: Washington

Funding: SPR 100%

Project Description and Objectives:

The Roadside Safety Research for MASH Implementation program is designed to conduct research on roadside safety priorities for research projects aligned with the MASH implementation completion schedule. The compliance dates for MASH roadside safety hardware are:

- December 31, 2017: W-beam barriers and cast-in-place concrete barriers;
- June 30, 2018: W-beam terminals;
- December 31, 2018: Cable barriers, cable barrier terminals, crash cushions;
- December 31, 2019: Bridge rails, transitions, all other longitudinal barriers (including portable barriers installed permanently), all other terminals, sign supports, and other breakaway hardware;
- Also, temporary work zone devices, including portable barriers, manufactured after December 31, 2019, must have been successfully tested to the 2015 edition of MASH.

<u>Financials</u>	<u>Amount</u>
Committed Funds SFY 2019	\$50,000
Committed Funds SFY 2018	\$50,000
Transferred Funds SFY 2018	\$50,000

TPF-5(353)-Clear Roads Phase II**Project Type:** Pooled Funds**MoDOT Contact:** Bill Stone**MoDOT Total Commitment:** \$75,000**Contract Period:** 1/1/2017 to 12/30/2021**Contract Investigator:** Minnesota DOT**Funding:** SPR 100%**Project Description and Objectives:**

The Clear Roads pooled fund project will maintain its focus on advancing winter highway operations nationally but will include a more pronounced emphasis on state agency needs, technology transfer and implementation. State departments of transportation are aggressively pursuing new technologies, practices, tools, and programs to improve winter highway operations and safety while maintaining fiscal responsibility. This pooled fund is needed to evaluate these new tools and practices in both lab and field settings, to develop industry standards and performance measures, to provide technology transfer and cost benefit analysis, and to support winter highway safety.

Financials

Committed Funds SFY 2019

Committed Funds SFY 2018

Transferred Funds SFY 2018

Amount

\$25,000

\$25,000

\$25,000

TPF-5(357)-Connecting the DOTs: Implementing ShakeCast Across Multiple State Departments of Transportation for Rapid Post-Earthquake Response**Project Type:** Pooled Funds**MoDOT Contact:** Bill Stone**MoDOT Total Commitment:** \$45,000**Contract Period:** 1/1/2017 to 6/30/2019**Contract Investigator:** California DOT**Funding:** SPR 100%**Project Description and Objectives:**

When an earthquake occurs, the U. S. Geological Survey (USGS) ShakeMap portrays the extent of potentially damaging shaking. In turn, the ShakeCast system, a freely-available, post-earthquake situational awareness application, automatically retrieves earthquake shaking data from USGS ShakeMap, analyzes shaking intensity data against users' facilities (e.g., bridges, buildings, roads), sends notifications of potential impacts, and generates maps and other web-based products for emergency managers and responders. ShakeCast is particularly suitable for earthquake planning and response purposes by Departments of Transportation (DOTs), in part since it can utilize State's existing NBI databases to implement shaking-based inspection priority and impact assessments. This collaborative effort will bring participating DOTs into full ShakeCast operation for post-earthquake assessment of state and local bridge inventories. The project will provide a mechanism to actively engage representatives from state DOTs with the common interests in implementing and expanding the application of ShakeCast technologies to improve emergency response capabilities.

<u>Financials</u>	<u>Amount</u>
Committed Funds SFY 2019	\$15,000
Committed Funds SFY 2018	\$15,000
Transferred Funds SFY 2018	\$15,000

TPF-5(360)-TRB Research Subscription FY 2018 & FY 2019

Project Type: Pooled Funds
MoDOT Contact: Bill Stone
MoDOT Total Commitment: \$348,812
Contract Period: 7/1/2017 to 9/30/2019
Contract Investigator: TRB
Funding: SPR 100%

Project Description and Objectives:

This is a subscription for support of core technical activities with the Transportation Research Board (TRB). The subscription is an agreement between MoDOT and the Transportation Research Board for the Research Correlation Service. The Research Correlation Service comprises a bundle of core services whose aim is to promote innovation through the coordination of research and dissemination of research results. The type of project is "Contract Other" because MoDOT purchases the services. The activities supported by this subscription include the collection of available information concerning past, current, and proposed research related to transportation. Sources including federal, state, and other governmental agencies, colleges and universities, research and planning organizations, transport operators and industry, as well as the TRB Annual Meeting and conference programs.

<u>Financials</u>	<u>Amount</u>
Committed Funds SFY 2019 (estimated)	\$176,346
Committed Funds SFY 2018	\$172,466
Transferred Funds SFY 2018	\$172,466

TPF-5(375) - MnROAD/NCAT Joint Study – Phase II

Project Type: Pooled Funds
MoDOT Contact: Bill Stone
MoDOT Total Commitment: \$150,000
Contract Period: 6/1/2012 to 9/30/2019
Contract Investigator: Minnesota DOT
Funding: SPR 100%

Project Description and Objectives:

MnROAD and NCAT are seeking organizations to join the partnership for the second phase of research efforts. Main objectives include:

1. Determining the life cycle cost of various pavement preservation alternatives in a highly controlled experiment that will provide state Departments of Transportation (DOTs) with the financial foundation to begin to build a decision tree for their own maintenance program
2. Develop quality assurance QA field testing protocols to correlate construction practices with long term performance of pavement preservation techniques.

3. Technology transfer - Answering practical questions posed by research sponsors through formal (i.e., reports & technical papers) & informal (e.g., one-on-one responses to sponsor inquiries) technology transfer on how these life extending benefits can be best utilized in each state.

<u>Financials</u>	<u>Amount</u>
Committed Funds SFY 2019	\$0
Committed Funds SFY 2018	\$150,000
Transferred Funds SFY 2018	\$150,000

TPF-5(418)-National Cooperative Highway Research Program (NCHRP) FY 2018 & TPF-5(419)-National Cooperative Highway Research Program (NCHRP) FY 2019

Project Type: Pooled Funds

MoDOT Contact: Bill Stone

MoDOT Total Commitment: \$2,160,000

Contract Period: 7/1/2015 to 6/30/2016

Contract Investigator: NCHRP

Funding: SPR 100%

Project Description and Objectives:

FHWA has a longstanding association with the American Association of State Highway and Transportation Officials (AASHTO) and the National Academy of Sciences for conducting the National Cooperative Highway Research Program (NCHRP) under the Transportation Research Board (TRB). Each year contributions to the NCHRP are requested from the states. The NCHRP meets the criteria for use of federal-aid funds and is authorized to use 100% State Planning and Research Funds for the contribution.

<u>Financials</u>	<u>Amount</u>
Committed Funds SFY 2019 (estimated)	\$1,100,000
Committed Funds SFY 2018	\$1,060,000
Transferred Funds SFY 2018	\$1,060,000

Development – SPR19DVS

Estimated Cost - \$93,090

TDyy0701 - Product testing in general

Project Type: New Products

MoDOT Contact: Balaji Nagarajan

Contract Period: 7/1/2017 to 6/30/2019

Funding: SPR 80%, State 20%

Project Description and Objectives:

Previously, sales persons have been able to contact many divisions, districts, and offices of MoDOT resulting in multiple evaluations, duplicated efforts, and potentially contradictory results. By setting a single point of contact, MoDOT can simplify applications, eliminate duplicate work, and improve evaluations of products. This project combines establishes a centralized application, a review method, and a database for all products submitted to MoDOT. Safety, cost, and minimum qualifications can be checked before resources are spent evaluating a product. If a product is selected for evaluation, then work is coordinated for better, faster, and less expensive testing. This project includes education to help personnel understand procedures and direct sales persons to the Coordinator.

Proposed Activities for SFY 2019:

This is an ongoing project to continually evaluate new products when submitted, update product information, improve centralized methods and information, share information department wide (even nationwide), and encourage two-way communication about products. The coordinators from the specification and non-specification efforts will need to develop a work-plan to be more responsive for incoming submissions.

SFY 2018 Accomplishments:

The new products system continues to be split between specification compliant and non-compliant products.

Financials

	<u>Amount</u>
Projected Budget SFY 2019	\$93,090
Budget Amount SFY 2018	\$84,350
Actual Cost SFY 2018	(See Addendum Sept. 2018)
Prior to SFY 2018 Actual Cost	N/A

Technology Transfer – SPR19TTS

Estimated Cost - \$497,500

LTAP = \$300,000

NHI = \$40,000

BEAP = \$120,000

TEAP = \$37,500

TTAP - LTAP Program

Project Type: Contracts Other

MoDOT Contact: Bill Stone

Contract Investigator: Missouri S&T

Funding: SPR 100%

TTAP Number	Calendar Year	SPR Work Program Timeline	Contract \$
TTAP-T001(32)	2017	7/1/17 through 12/31/17	\$119,163
TTAP-T001(33)	2018	1/1/18 through 12/31/18	\$300,000
TTAP-T001(34)	2019	1/1/19 through 6/30/19	\$100,000

Project Description and Objectives:

The Local Technical Assistance Program (LTAP) was established by the Federal Highway Administration (FHWA) in 1982 in response to a recognized need for funding and technical support to the 38,000 communities that maintain local roads and bridges. The Missouri LTAP center is located at Missouri University of Science and Technology. The center enables local counties, parishes, townships, cities and towns to improve their roads and bridges by supplying them with a variety of training programs; new and existing technology updates; and personalized technical assistance. Through these core services, the LTAP center provides access to training and information that may not otherwise be accessible.

Accomplishments

CY 2017:

The Task Order was executed by the Commission on January 27, 2017. There was a joint Advisory Committee and Ambassadors meeting on April 7, 2017. This meeting provides LTAP an opportunity to provide progress of the program to the committee. For Calendar Year 2017 there were 81 classes with 3,925 attendees.

CY 2018:

The Task Order was executed by the Commission on December 22, 2017. There was a joint Advisory Committee and Ambassadors meeting on November 8, 2017. This meeting provides LTAP an

opportunity to provide progress of the program to the committee. For Calendar Year 2018 for the first quarter there were 15 classes with 393 attendees.

Proposed Activities

CY 2018 & CY 2019:

- Will be seeking to expand our LTAP contact list by developing partnerships with various organizations. Also continue to look for partnerships through the Local Public Agency LPA efforts with MoDOT.
- Provide technology transfer materials.
- Provide increased information services - Continue to review and update the webpage to increase the services provided online and the links available.
- Conduct and arrange seminars & workshop training sessions.
- Continue offering "Show Me" Roads Scholar Program Level I courses; will be offering more Level II classes.
- Develop more Level II courses.
- Pursue additional funding sources that will allow the program to be expanded. This would allow us to further promote LTAP and our training and services.
- Continue to assist the MoDOT Local Public Agency efforts through training and other administrative opportunities.
- Evaluate program effectiveness.
- Create efficiencies in providing tech transfer materials and training by sharing resources and cost sharing with the Rural Technical Assistance Program (RTAP) on such deliverables as e-newsletters, arranging training and providing materials.

Financials

	<u>Amount</u>
Projected Budget SFY 2019	\$300,000
Budget Amount SFY 2018	\$300,000
Actual Cost SFY 2018	(See Addendum Sept. 2018)
Actual Cost SFY 2017	\$337,139

TT200701 - NHI National Highway Institute Training SFY 2018 & SFY 2019

Project Type: Contracts Other

MoDOT Contact: Bill Stone

Total Contract Amount: \$83,000

Contract Period: 7/1/2017 to 6/30/2019

Contract Investigator: Sherron Motts

Funding: SPR 80%, State 20%

Project Description and Objectives:

The National Highway Institute (NHI) as part of FHWA is a source for training the transportation community. NHI provides a catalog of available courses that MODOT can purchase and host. Construction and Materials provides research funding in the amount up to \$40,000. The type of project is "Contract Other" because MoDOT purchases the classes. NHI training courses provide direction and support to department personnel. Courses are scheduled and provided for department personnel to maintain an understanding of new methodologies and technologies. Training is also provided to meet employee needs and enhance their abilities to support the department's functions.

Proposed Activities for SFY 2019:

Provide opportunity for training of department personnel through NHI courses. Other training opportunities may be offered that support department functions, including on-site classes and workshops necessary to maintain our goal.

SFY 2018 Accomplishments:

There was an expenditure in Fiscal Year 2018. This was an expenditure of \$9,588.32 processed in August 2107 for the payment of a class that was received last year that was not processed in Fiscal Year 2017.

Financials

	<u>Amount</u>
Projected Budget SFY 2019	\$40,000
Budget Amount SFY 2018	\$43,000
Actual Cost SFY 2018	(See Addendum Sept. 2018)
Prior to SFY 2018 Actual Cost	N/A

BEAP Program 2018 and 2019

Project Type: Contracts Other

MoDOT Contact: Bill Stone

Total Contract Amount: \$240,000

Contract Period: 7/1/2017 to 6/30/2019

Funding: SPR 80%, State 20%

Problem, Background, and Significance:

The BEAP program has been in existence for a number of years. It provides an avenue for local agencies without engineering expertise to get some engineering assistance, through approved consultants, to deal with problems on their bridges. The Bridge Division administers the BEAP program. The type of project is "Contract Other" because the project work will include contract management. The objective of this program is to provide engineering technical assistance to various local agencies to deal with operational problems on their bridges. This assistance results in reports that are provided to the local agencies providing them with options for addressing these issues. Implementation by the local agency of the recommendations from these reports will result in improvements to the functionality and safety of their bridges.

Proposed Activities for SFY 2019:

Provide opportunity for local agencies to get technical assistance for bridge engineering problems. It is estimated that the available funds will allow for around 30 BEAP projects. The total number of projects per year will vary depending on the scope and final cost of individual projects.

SFY 2018 Accomplishments:

The funding allocation for SFY2018 has allowed for 34 BEAP studies to provide technical assistance for operational problems on 37 local agency bridges. As of 5/10/18, 28 of these studies have been completed.

Financials

Projected Budget SFY 2019
 Budget Amount SFY 2018
 Actual Cost SFY 2018
 Prior to SFY 2018 Actual Cost

Amount

\$120,000
 \$120,000
 (See Addendum Sept. 2018)
 N/A

TEAP Programs 2018 and 2019**Project Type:** Contracts Other**MoDOT Contact:** Bill Stone**Total Contract Amount SPR:** \$60,000**Total Contract Amount Local Agency Match:** \$15,000**Total Contract Amount:** \$75,000**Contract Period:** 7/1/2017 to 6/30/2019**Funding:** SPR 80%, State 20%**Problem, Background, and Significance:**

The TEAP program has been in existence for a number of years. It provides an avenue for local agencies without engineering expertise to get some engineering assistance, through approved consultants, to deal with problems on their roadways. The Design Division administers the TEAP program. The type of project is "Contract Other" because the project work will include contract management. The objective of this program is to provide engineering technical assistance to various local agencies to deal with operational problems on their bridges and roadways. This assistance results in reports that are provided to the local agencies providing them with options for addressing these issues. Implementation by the local agency of the recommendations from these reports will result in improvements to the functionality and safety of their roadways.

Proposed Activities for SFY 2019:

Provide opportunity for local agencies to get technical assistance for traffic engineering problems. At the time funding was awarded for FY 2018 TEAP projects, funding for FY 2019 projects was made available for award, as well. As a result, 11 TEAP projects were awarded to occur in FY 2019. Beyond FY 2019, the total number of projects per year will vary depending on the scope and final cost of individual projects. The TEAP program is managed by MoDOT's Design Division's LPA group.

SFY 2018 Accomplishments:

The funding allocation for SFY2018 allowed for 11 TEAP studies to provide technical assistance for local agency roadways. The eleven projects were from a combination of technical transfer funding and highway safety funding.

Financials

Projected Budget SFY 2019
 Budget Amount SFY 2018
 Actual Cost SFY 2018
 Prior to SFY 2018 Actual Cost

Amount

\$37,500
 \$37,500
 (See Addendum Sept. 2018)
 N/A

ADDENDUM

State Planning and Research Program
Fiscal Year 2018 Annual Report - (07/01/2017 - 06/30/2018)

PART I - PLANNING

Transportation Planning Activities	SFY 2018 Budget with Match	SFY 2018 Expenditures with Match
<ul style="list-style-type: none"> Administration Planning and Performance Group <ul style="list-style-type: none"> Planning and Policy Group Strategic Planning Group Statewide Programming Transportation Systems Management <ul style="list-style-type: none"> Administration Mapping and Customer Service Pavement Analysis and Application Dev. Traffic Collection <ul style="list-style-type: none"> Field Acquisition Data 	\$1,158,168 \$480,561 \$430,688 \$642,494 \$3,451,047 \$121,198 \$575,570 \$606,776 \$448,208 \$1,214,076 <u>\$485,219</u>	\$1,074,565 \$550,030 \$415,665 \$675,886 \$3,326,404 \$150,122 \$691,769 \$651,669 \$453,706 \$906,415 <u>\$472,724</u>
SUBTOTAL	\$6,162,958	\$6,042,550
<i>District Transportation Planning</i>		
<ul style="list-style-type: none"> CD KC NE NW SE SL SW 	\$1,345,496 \$1,409,313 \$910,458 \$608,687 \$941,902 \$1,029,489 <u>\$946,588</u>	\$1,385,775 \$1,468,937 \$936,147 \$555,386 \$868,478 \$977,158 <u>\$849,622</u>
SUBTOTAL	\$7,191,933	\$7,041,503
<i>Other Activities</i>		
<ul style="list-style-type: none"> Information Systems Regional Planning Commission Financial Planning & Reporting Bridge Division Design Division Innovative Partnerships and Alternative Funding 	\$3,152,143 \$1,375,000 \$1,191,184 \$300,774 \$546,874 <u>\$623,329</u>	\$3,095,044 \$1,364,655 \$1,238,507 \$166,390 \$456,812 <u>\$181,021</u>
SUBTOTAL	\$7,189,304	\$6,502,428
TOTAL PART I	\$20,544,195	\$19,586,481

Part II – Urban (MPO) – PL

Metropolitan Areas	FY 2018 CPG Funds with Match	FY 2018 CPG Expenditures with Match
NW Arkansas	\$8,750	\$8,750
Kansas City	\$2,481,706	\$1,246,622
St. Louis	\$5,144,045	\$4,263,888
Springfield	\$943,333	\$974,127
Columbia	\$509,339	\$283,336
Jefferson City	\$175,978	\$67,819
Joplin	\$322,708	\$93,355
St. Joseph	\$222,713	\$93,185
Cape Girardeau	<u>\$269,620</u>	<u>\$103,309</u>
TOTAL PART II	\$10,078,190	\$7,134,390

Part III – Research – SPR

Activity	SFY 2018 Budget with Match	SFY 2018 Expenditures with Match
• Administration (SPR18ADS)	\$254,751	\$259,140
• Research (SPR18RDS)	\$1,776,782	\$1,901,290
• Development (SPR18DVS)	\$84,350	\$1,828
• Technology Transfer (SPR18TTS)	<u>\$493,000</u>	<u>\$440,696</u>
TOTAL PART III	\$2,608,883	\$2,602,956

TOTAL MoDOT SPR WORK PROGRAM

	SFY 2018 Budget with Match	SFY 2018 Expenditures with Match
• Part I – Planning	\$20,544,195	\$19,586,481
• Part II – Metropolitan Planning	\$10,078,190	\$7,134,390
• Part III – Research	<u>\$2,608,883</u>	<u>\$2,602,956</u>
TOTAL MoDOT SPR WORK PROGRAM	\$33,231,268	\$29,323,826

Part III Research
Addendum September 2018
SFY2018 Budget to Actual

Project Number	Project Description	SFY 2018 Budget	SFY 2018 Actual
Administration - SPR18ADS		\$254,751	\$259,140
TA186601	Research Administration	\$254,751	\$259,140
Research - SPR18RDS	Research	\$1,776,782	\$1,901,290
Research General			
TR18CONT	Research Contingencies	\$232,274	N/A
Research Contracts			
TR201313	Secretary of State Library MOU	\$4,955	\$4,955
TR201518	Roller Compacted Concrete	\$9,079	\$2,039
TR201522	MoDOT Customer Satisfaction Tracking Survey	\$12,887	\$11,046
TR201601	Library Support Contract (2016-2017)	\$10,394	\$10,394
TR201609	MEPDG Local Calibration	\$150,317	\$67,008
TR201610	AASHTO Technical Service Program	\$48,000	\$53,000
TR201613	Work Zone Split Traffic Symbol Sign	\$37,896	\$37,896
TR201614	Zero Cement Concrete	\$74,338	\$72,960
TR201616	Missouri Highway Safety Manual Recalibration	\$55,961	\$56,216
TR201701	Internal Curing	\$20,817	\$20,817
TR201702	High Volume Recycled Materials Phase II	\$1,958	\$27,102
TR201703	Economical and Crack Free High Performance Concrete Phase II	\$1,510	\$29,490
TR201704	Design of Ultra High Performance Concrete for Thin Overlays	\$8,570	\$8,557
TR201705	Implementation of FR SCC and FR SWC Phase II	\$10,166	\$24,914
TR201709	Runway Condition Index for State Funded Airports	\$135,692	\$135,692
TR201710	MoDOT Fleet Analysis	\$56,971	\$140,762
TR201711	Economic Impact Study for Public Ports	\$298,675	\$236,093
TR201712	Performance Characteristics of Recycled Asphalt	\$99,205	\$93,987
TR201713	Cold Temperature Creep Compliance	\$12,737	\$10,693
TR201714	Investigation of Existing Foundations under Consideration for Reuse	\$57,162	\$57,162
TR201715	Erosion Control Blanket Workshop Training	\$0	\$4,277
TR201717	Auto Flagger	\$144,334	\$93,198
TR201720	Rejuvenating Asphalt Products	\$157,554	\$157,554
TR201722	Evaluation of Green Lights on TMAs	\$100,000	\$133,235
TR201724	MoDOT Report Card Survey	\$0	\$43,355
TR201725	USGS Scan of Gasconade River Bridges	\$0	\$0
TR201801	Library Support Contract (2018-2019)	\$90,000	\$92,934
TR201802	IC-IR Consultant Contract-Phase 2	\$53,092	\$53,092
TR201803	Facebook Surveys—RTS Fiscal Year 2018	\$31,500	\$4,607
TR201804	Field Implementation of Rubberized Chip Seal	\$37,200	\$37,200
TR201806	Perform.-Based Specs of Fiber-Reinf. Concrete to Enhance Perform. and Reduce Steel-Reinf. in Structural Members	\$0	\$0
TR201807	Understanding and Improving Heterogeneous, Modern Recycled Asphalt Mixes	\$98,571	\$98,571
TR201808	UAS State of the Practice for Transportation	\$20,000	\$20,000
TR201809	Assessment and Repair of Corroded Steel H-Piles	\$43,577	\$43,577
TR201811	Support for Balanced Asphalt Mixture Design Specification Development in Missouri	\$0	\$0
TR201812	Infrastructure Conference Invoice-Fiscal Year 2018	\$3,000	\$3,000
TR201813	Leader-Follower TMA System	\$0	\$0
TR201814	Leader-Follower TMA System Misc. Expenses	\$7,800	\$7,800
TR201815	TITAN - An Interactive Web-based Platform for Transportation Data InTegration and ANalytics	\$0	\$0
TR201817	Field Implementation of Rubberized Chip Seal Materials	\$8,107	\$8,107

TR201903	Facebook Surveys--RTS Fiscal Year 2019		\$0	\$0
		total	\$1,902,025	\$1,901,290
Development - SPR18DVS			\$84,350	\$1,828
TD180701	New Product Evaluation		\$84,350	\$1,828
Technology Transfer - SPR18TTS			\$493,000	\$440,696
TTAPT001	Local Technical Transfer Assistance Program (LTAP)		\$300,000	\$282,040
TTAPT001	BEAP		\$120,000	\$119,068
TTAPT001	TEAP		\$30,000	\$30,000
TT200701	NHI National Highway Institute Training		\$43,000	\$9,588
Total SFY 2018 Part III Budget			\$2,608,883	\$2,602,956