Research Program Manual

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Arizona Department of Transportation

ARIZONA TRANSPORTATION RESEARCH CENTER

RESEARCH PROGRAM MANUAL

Review Date: March 1, 2008

This document describes the standard operating procedures for the primary program activities of the Arizona Transportation Research Center (ATRC). While exceptions may occur, these procedures will govern the majority of ATRC activities.

This document must be reviewed by the date shown on this page.

Approved:

_____

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ACRONYMS AND ABBREVIATIONS

AASHTO	American Association of State Highway and Transportation Officials
ADOT	Arizona Department of Transportation
APL	Approved Products List
ATRC	Arizona Transportation Research Center
CFR	Code of Federal Regulations
DOT	Department of Transportation
ERQ	Electronic Request for Quotes
FHWA	Federal Highway Administration
FY	Fiscal Year
ITD	Intermodal Transportation Division (ADOT)
JPA	Joint Project Agreement
LTAP	Local Technical Assistance Program
MatPEC	Materials Product Evaluation Committee
Melvyl	The University of California Library catalog
NCHRP	National Cooperative Highway Research Program
NTIS	National Technical Information Service
OCLC	Online Computer Library Center
PRIDE	Product Resource Investment Deployment and Evaluation
RAC	Research Advisory Committee (under AASHTO and SCOR)
RD&T	Research, Development & Technology Transfer
RiP	Research in Progress
RFP	Request for Proposal
RFQ	Request for Quotation
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users
SCOR	Standing Committee on Research (under AASHTO)
SPR	State Planning and Research
TAC	Technical Advisory Committee
TCPEC	Traffic Control Product Evaluation Committee
TPD	Transportation Planning Division (ADOT)
TPF	Transportation Pooled Fund
TRACS	Transportation Accounting System
TRB	Transportation Research Board
TRIS	Transportation Research Information Services
TRQS	Transportation Research Quick Study
U.S.C.	United States Code

1.0 INTRODUCTION

1.1 Procedures Manual Overview

The Arizona Transportation Research Center (ATRC) directs the Arizona Department of Transportation (ADOT) research program. This manual describes the management and functions of the research program. It presents the following information:

- A description of Federal Highway Administration and ADOT program requirements.
- An overview of ATRC administrative procedures.
- A description of ATRC research program activities and how they function.
- A description of the ADOT Product Resource Investment Deployment and Evaluation (PRIDE) program.
- An overview of the ATRC library functions.
- Roles of ADOT staff in the research program.
- Roles of non-ADOT entities and individuals, including universities, other government agencies, and the private sector.

2.0 ATRC OVERVIEW

2.1 ATRC Mission and Vision

ATRC adopted the following mission and vision statements in September 2004.

MISSION

The ATRC mission is to pursue and share knowledge in transportation systems and programs.

VISION

ATRC sets the national standard of excellence for transportation research, product evaluation and library services.

2.2 Federal Statutes and Regulations

The primary source of funding for the ATRC research program is the Federal Highway Administration (FHWA) under provisions of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). Federal regulations (23 CFR 420 *et seq*.) outline the requirements for State Planning and Research (SPR) programs. Pursuant to 23 CFR 420.107(a) at least 25 percent of the SPR program funds must be used for Research, Development, and Technology Transfer (RD&T).

The FHWA regulatory requirements for state research programs are described in 23 CFR 420.209. These regulations state:

> **§ 420.209 What are the conditions for approval?**
>
> (a) As a condition for approval of FHWA planning and research funds for RD&T [research, development, and technology transfer] activities, a State DOT [Department of Transportation] must develop, establish, and implement a management process that identifies and results in implementation of RD&T activities expected to address high priority transportation issues. The management process must include:
>
> (1) An interactive process for identification and prioritization of RD&T activities for inclusion in an RD&T work program;
>
> (2) Use of all FHWA planning and research funds set aside for RD&T activities, either internally or for participation in transportation pooled fund studies or other cooperative RD&T programs, to the maximum extent possible;
>
> (3) Procedures for tracking program activities, schedules, accomplishments, and fiscal commitments;
>
> (4) Support and use of the TRIS database for program development, reporting of active RD&T activities, and input of the final report information;

(5) Procedures to determine the effectiveness of the State DOT's management process in implementing the RD&T program, to determine the utilization of the State DOT's RD&T outputs, and to facilitate peer exchanges of its RD&T Program on a periodic basis;

(6) Procedures for documenting RD&T activities through the preparation of final reports. As a minimum, the documentation must include the data collected, analyses performed, conclusions, and recommendations. The State DOT must actively implement appropriate research findings and should document benefits; and

(7) Participation in peer exchanges of its RD&T management process and of other State DOTs' programs on a periodic basis. To assist peer exchange teams in conducting an effective exchange, the State DOT must provide to them the information and documentation required to be collected and maintained under this subpart. Travel and other costs associated with the State DOT's peer exchange may be identified as a line item in the State DOT's work program and will be eligible for 100 percent Federal funding. The peer exchange team must prepare a written report of the exchange.

(b) Documentation that describes the State DOT's management process and the procedures for selecting and implementing RD&T activities must be developed by the State DOT and submitted to the FHWA Division office for approval. Significant changes in the management process also must be submitted by the State DOT to the FHWA for approval. The State DOT must make the documentation available, as necessary, to facilitate peer exchanges.

(c) The State DOT must include a certification that it is in full compliance with the requirements of this subpart in each RD&T work program. If the State DOT is unable to certify full compliance, the FHWA Division Administrator may grant conditional approval of the State DOT's work program. A conditional approval must cite those areas of the State DOT's management process that are deficient and require that the deficiencies be corrected within 6 months of conditional approval. The certification must consist of a statement signed by the Administrator, or an official designated by the Administrator, of the State DOT certifying as follows: “I (name of certifying official), (position title), of the State (Commonwealth) of ____, do hereby certify that the State (Commonwealth) is in compliance with all requirements of 23 U.S.C. 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.”

(d) The FHWA Division Administrator shall periodically review the State DOT's management process to determine if the State is in compliance with the requirements of this subpart. If the Division Administrator determines that a State DOT is not complying with the requirements of this subpart, or is not performing in accordance with its RD&T management process, the FHWA Division Administrator shall issue a written notice of proposed determination of noncompliance to the State DOT. The notice will set forth the reasons for the proposed determination and inform the State DOT that it may reply in writing within 30 calendar days from the date of the notice. The State DOT's reply should address the deficiencies cited in the notice and provide documentation as necessary. If the State DOT and the Division Administrator cannot resolve the differences set forth in the determination of nonconformity, the State DOT may appeal to the Federal Highway Administrator whose action shall constitute the final decision of the FHWA. An adverse decision shall result in immediate withdrawal of approval of FHWA planning and research funds for the State DOT's RD&T activities until the State DOT is in full compliance.

2.3 Policies—ADOT, TPD and ATRC

ATRC staff is subject to ADOT, TPD and ATRC policies. ADOT policies are available on the ADOT intranet (ADOTNet). TPD policies are issued informally, usually through e-mail. ATRC maintains a *Policies and Procedures* document that is available to ATRC staff on the ADOT computer network.

2.4 Research Programs

Major Projects

For projects with budgets greater than $15,000 (per fiscal year), selection and ranking occurs annually. The selection and ranking are performed by the ADOT Research Council. (See *Section 4.2*.)

Projects may be approved with budgets proposed in more than one fiscal year. This typically only occurs for large budget projects that take several years to complete. It is a means of spreading the cost so it does not have an adverse impact on a single year's budget. If a project is approved for multiple budget years it does not require approval in subsequent budget years. The funding in future budget years is allocated prior to selecting the new projects for that budget year.

For example, consider a project with a budget of $600,000, where $300,000 is allocated in the FY2008 budget and $300,000 in the FY2009 budget. When FY2009 projects are developed, $300,000 is removed from the available funding and assigned to the approved project prior to selecting new projects for FY2009.

Small Budget Projects

The ATRC small budget program is operated under the following guidelines:

- The annual budget for this program is $100,000. The amount can be increased at the discretion of the ATRC manager.
- The initial budget for each project cannot exceed $15,000.
- Projects may be proposed at any time during the year.
- Proposals approved by the Research Council will be funded until the small budget funds are appropriated. If the annual budget is not used the funds will be transferred to other ATRC projects or activities.

TRQS Projects

Transportation Research Quick Study (TRQS) projects have a budget of $5,000 or less. The current annual budget for this program is $10,000. The ceiling was increased during 2006 from $2,500 to $5,000. The program budget will be increased to $20,000 for fiscal year 2008. TRQS projects are authorized at the discretion of the ATRC manager. Proposals may be presented to the ATRC manager for TRQS funding by anyone in ADOT. The primary criteria are that the proposal have a research element and offer a benefit to ADOT.

Pooled Fund Projects

The current annual budget for pooled fund projects is $50,000. The Research Council will be consulted by e-mail on all pooled fund proposals of $10,000 or greater. Decisions on amounts under $10,000 will be made by ATRC unless the ATRC manager elects to elevate the decision to the Research Council. The decision will be based on a vote of the Research Council. (See *Section 4.2*.)

2.5 Research Advisory Committee (AASHTO)

The American Association of State Highway and Transportation Officials (AASHTO) established the Standing Committee on Research (SCOR) after its 1987 annual meeting. As a part of SCOR's charter AASHTO directed SCOR to create a Research Advisory Committee (RAC) with each Member Department entitled to representation. States are limited to three RAC members, with a total of one vote among them.

The ADOT Director appoints the ADOT RAC members. The appointment is forwarded to the AASHTO President for concurrence. Only appointments signed by the ADOT Director are considered official. When appointed, these are the only official members of RAC. RAC membership designations originate at the state level. The ADOT RAC member is usually the ATRC manager.

Regions

There are four regions within the RAC membership. ADOT is a member of RAC Region 4 (the Western Region). The National RAC as well as each regional RAC has a chair and vice-chair.

Meetings

The National RAC meets twice each year. It holds a meeting during the Transportation Research Board annual meeting, which usually occurs during January. This meeting is sometimes a joint meeting with the AASHTO Standing Committee on Research

(SCOR). During the summer the National RAC meets for 2-3 days. Meeting locations are rotated among the four RAC regions.

Each RAC region may have additional meetings or communications. RAC Region 4 currently holds a teleconference approximately 4 times a year.

Distribution Lists

Both the National RAC and RAC Region 4 maintain a list-serve to contact RAC members and others involved in RAC activities. One of the primary uses of these list-serves is for informal surveys or questionnaires. RAC members coordinate responses to these questions. The ADOT RAC member reviews each request for information and either responds directly or sends it to the appropriate ADOT group for a response.

NCHRP Coordination

The ADOT RAC member coordinates interaction with the National Cooperative Highway Research Program (NCHRP).

2.6 Peer Exchanges

Research peer exchanges are required by Federal Highway Administration (FHWA) regulation 23 CFR, Section 420.209(a) which states in part:

> (a) As a condition for approval of FHWA planning and research funds for RD&T activities, a State DOT must develop, establish, and implement a management process that identifies and results in implementation of RD&T activities expected to address high priority transportation issues. The management process must include: . . .
> (7) Participation in peer exchanges of its RD&T management process and of other State DOTs' programs on a periodic basis.

FHWA clarified this requirement in a 1994 guideline memorandum that stated peer exchanges should be held once every three years.

FHWA regulation 23 CFR 420.203 defines peer exchange. The definition states:

> *Peer exchange* means a periodic review of a State DOT's RD&T program, or portion thereof, by representatives of other State DOT's, for the purpose of exchange of information or best practices. The State DOT may also invite the participation of the FHWA, and other Federal, State, regional or local transportation agencies, the Transportation Research Board, academic institutions, foundations or private firms that support transportation research, development or technology transfer activities.

ATRC held research peer exchanges in 1998, 2002 and 2005.

2.7 Transportation Research Board (TRB)

TRB Research Correlation Services

ADOT contributes to the general support of Transportation Research Board (TRB). The contribution acknowledges that a minimum level of service from TRB is available. The support is contributed from the Federal-aid SPR program allocation. The TRB general support is an established line item in the SPR Annual Work Program and is listed as "Research Correlation Services."

ADOT signed a 3-year subscription service agreement with TRB during March 2006. The agreement commits ADOT to payments to TRB of $136,380 each year for the 2007-2009 triennium fiscal year from July 1, 2006 to June 30, 2009. TRB will invoice ADOT each year for payments. Payments are due on July 1 for the upcoming fiscal year (e.g., the FY2008 payment is due on 7/1/2007). Payments are made from ATRC account R0111. The ATRC payments are made from the prior fiscal year budget. For example, the TRB FY2008 payment would be made from the ATRC FY2007 budget because the ATRC FY2008 funds are not available until fall 2007.

TRB State Representative

The TRB state representative is an ATRC staff person, usually the ATRC manager. The TRB state representative serves as ADOT's primary contact with TRB. TRB is a division of the National Academies, which include the National Academy of Science, the National Academy of Engineering, the Institute of Medicine, and the National Research Council. The National Academies serve as an independent advisor on scientific and technical questions of national importance.

The TRB state representative coordinates the dissemination of TRB information to ADOT, facilitates ADOT participation in TRB committees, and coordinates the annual visit to ADOT from TRB staff.

2.8 National Cooperative Highway Research Program (NCHRP)

The National Cooperative Highway Research Program (NCHRP) was created in 1962 to conduct research on acute problems affecting highway planning, design, construction, operation, and maintenance nationwide. It is administered by TRB and sponsored by the AASHTO member departments (i.e., individual state departments of transportation), in cooperation with FHWA.

The state departments of transportation are the sole sponsors of the NCHRP. Support is voluntary and funds are drawn from the states' Federal-Aid Highway apportionment of State Planning and Research (SPR) funds. The funds can be spent only for the administration of problems approved on ballot by at least two-thirds of the states. Each

state's allocation amounts to 5.5 percent of its SPR apportionment and is set forth in supplementary tables issued with each year's Federal-Aid Highway apportionments.

Each year (usually during July) the AASHTO Standing Committee on Research (SCOR) solicits problem statements from four authorized sources: (1) the chief administrative officers of the member highway or transportation departments, (2) the chairs of AASHTO's committees and subcommittees, (3) AASHTO's Board of Directors, and (4) the Federal Highway Administrator. The ADOT RAC member sends this request for new problem statements to interested individuals within ADOT, such as the Research Council, and assists those who wish to develop an NCHRP problem statement. The ADOT RAC member collects the proposals and submits them to NCHRP.

Problem statements are due to NCHRP staff by September 15. FHWA and NCHRP then evaluate them. These evaluations are sent to the submitters around mid-November, and submitters have until early December to comment on the evaluations or withdraw their problem statement. NCHRP is experimenting with evaluation panels for some of the more popular subject areas, such as bridges, materials, and traffic and safety. In these cases, the collective thoughts of the panel are conveyed back to the submitter instead of the FHWA and NCHRP evaluations.

NCHRP funds research projects with a national scope. Budgets for these projects are often larger than most state research projects.

While new project statements are being developed NCHRP panels and staff are also working on recommendations for continuations of projects begun in earlier years. Late each December, a report on the continuation projects and new research candidates goes to the SCOR and the AASHTO Research Advisory Committee (RAC) with a ballot for rating the problems according to priority.

The ADOT RAC member coordinates ADOT's evaluation of the problem statements. The RAC member assigns proposals to individuals within ADOT for evaluation. The RAC member then compiles ADOT's recommendations and submits them to NCHRP after reviewing them with the ADOT Director.

The average ratings of SCOR and RAC are returned to the SCOR Secretary (i.e., the Director of the Cooperative Research Programs) and used to rank the proposals. A summary report is sent to the SCOR for review prior to its annual meeting in late March to determine final priorities and formulate a program. Based on the funding expected from Federal-Aid Highway apportionments for the given fiscal year, SCOR determines which completed or ongoing projects should receive additional funding for further work and which new problem submittals should be programmed. An *Announcement of Research Projects* is prepared in April each year. This *Announcement* details the preliminary scopes of work that will be considered in requests for proposals. A list of these projects is also available at www4.nas.edu/trb/crp.nsf/upcoming.

After acceptance by the National Academies (authority delegated to TRB's Executive Committee Subcommittee for the NCHRP) for administration by the Transportation Research Board, the problems are assigned to panels of experts who provide guidance on the technical aspects of the research and translate the AASHTO problem statements into NCHRP research project statements with well-defined objectives. On the basis of these statements, TRB solicits research proposals from private and public research organizations that can demonstrate capability and experience in the problem area to be researched. These organizations include universities, nonprofit institutions, consulting and commercial firms, and individual consultants. Guidance for the preparation of proposals is included in the NCHRP brochure, *Information and Instructions for Preparing Proposals* (Updated June 2004).

The technical panels review the proposals, recommend contract awards, monitor research progress, provide technical guidance, and review reports for acceptability and for accomplishment of the agency's research plan. They also provide counsel to TRB staff in matters of overall project administration. Selected agencies perform research under contract to the National Academies, guided by the *Procedural Manual for Agencies Conducting Research in the National Cooperative Highway Research Program*. Guidance for the preparation of final reports for submission to the NCHRP is found in the brochure *Instructions for Preparation of Cooperative Research Programs Reports*.

Research findings are published in the *NCHRP Report* series and the *NCHRP Synthesis of Highway Practice* series, or as an NCHRP Internet document. The reporting format is designed specifically to accommodate the transportation administrator and practicing engineer. In addition, to provide the earliest possible awareness and use of the research findings, *NCHRP Research Results Digests* and *NCHRP Legal Research Digests* are issued as warranted. All of these reports are available at the TRB Bookstore; many are also published on the Internet. Copies of all published reports are issued to the chief administrative officer of each highway and transportation department and widely within TRB circles.

2.9 Local Technical Assistance Program

The ADOT Local Technical Assistance Program (AZ LTAP) is administered by the Intermodal Transportation Division, Technical Training Group (ITD Tech). The AZ LTAP currently receives $68,000 annually from the SPR research budget to assist its program. AZ LTAP services are provided within the framework of the broader ITD Tech mission.

The National LTAP program provides technical training for the local communities. One AZ LTAP goal is to provide local transportation agencies and public works officials with technical assistance such as advice, guidance, and referral services. Technical assistance is often provided in areas such as road construction, maintenance, and

administrative issues. This service is not intended to supplant or compete with traditional engineering or consulting services, but rather to augment them. In addition to training classes, AZ LTAP maintains library of video tapes on topics such as safety issues, preventative methods, and new technology.

The AZ LTAP newsletter, *Arizona Milepost*, is published four times a year. Each newsletter focuses on a specific topic. The AZLTAP web site may be accessed at: www.azltap.org.

3.0 ORGANIZATION

3.1 ATRC

ATRC is part of the Arizona Department of Transportation (ADOT) Transportation Planning Division (TPD). The responsibilities of ATRC personnel are described in this section.

Manager — reports to the TPD Director

- Supervises Project Managers, Librarian and support staff
- Insures ATRC Group compliance with FHWA and ADOT policies
- Coordinates the PRIDE program (See *Product Resource Investment Deployment and Evaluation (PRIDE) Program*)
- Coordinates the activities of the research Steering Committee
- Chairs the Research Council
- Coordinates pooled fund project participation
- Prepares and manages the research budget
- Coordinates submittal of documents required by FHWA, including the annual program book, quarterly reports, and project completion documentation.
- Coordinates final report reviews with the technical editor and check all final reports for completeness
- Coordinates the development and submittal of proposals to the National Cooperative Highway Research Program (NCHRP)
- Coordinates the evaluation of NCHRP research proposals
- Issues and maintains ATRC Group policies

Project Managers

- Coordinate the development of new research proposals, including identifying project Champions and Sponsors
- Assemble technical advisory committees for research projects
- Prepare procurement documents for research projects
- Coordinate the selection and hiring of researchers
- Manage research contracts and budgets
- Coordinate the review of project deliverables, including the final report
- Provide *ad hoc* research assistance to ADOT

Librarian

- Manages the ATRC library
- Orders publications
- Maintains the ATRC web site
- Conducts literature searches for ATRC project managers and other ADOT staff

Field Technician — reports to Long Term Pavement Performance (LTPP) project manager

- Collects and downloads data to computer from weigh-in-motion (WIM) sites in Arizona
- Compiles and analyzes WIM data

Support Staff — includes part-time administrative staff from the TPD administrative group that provides services to ATRC as well as contract employees.

- File project documents, process budget transfers, prepare purchase orders and coordinate the preparation of Joint Project Agreements for certain intergovernmental or university contracts
- Assist with Library tasks, including cataloguing and filing
- Provide administrative support for the PRIDE program, including logging in PRIDE applications, sending applications to PRIDE evaluators, compiling evaluation reports, preparing letters to PRIDE applicants, and assisting with preparation for Product Evaluation Committee meetings

Organization charts for ADOT and ATRC are included in *Appendix A*.

The ATRC Group policies are stored in a common computer folder, accessible to ATRC staff.

3.2 Core Team

The Arizona Transportation Research Center functioned with a research Steering Committee providing policy oversight to the ADOT research program for several years. The Steering Committee included: John Bogert (Chief of Staff), Dale Buskirk (Director, Transportation Planning Division), Jim Dickey (Director, Public Transportation Division), Sam Elters (State Engineer), Robert Hollis (FHWA), David Jankofsky (ADOT Deputy Director), Victor Mendez (ADOT Director), and Stacey Stanton (Director, Motor Vehicle Division).

Due to the difficulty in getting the Steering Committee together for meetings, a suggestion was offered at the last Steering Committee meeting on November 2, 2005 that the Steering Committee functions be taken over by the Core Team. This suggestion was discussed by the Research Council and presented to the entire Steering Committee for review.

The Steering Committee agreed to this change. Therefore, the Steering Committee was dissolved during April 2006 and the research program policy oversight handled by the ADOT Core Team.

The following actions result from this change:

1. The function of the research Steering Committee, to provide policy guidance to the ADOT research program, is now transferred to the Core Team. The Steering Committee, as a separate entity, is now dissolved.
2. ATRC will plan on making two presentations to the Core Team each year about the research program. This will be an opportunity to update the Core Team on research program activities as well as discuss policy questions related to the program.
3. The ATRC manager (Frank Darmiento) now has the authority to select new Research Council members. Issues related to these appointments that cannot be resolved will be referred to the Transportation Planning Division Director (Dale Buskirk).

The current Core Team members are:

John Bogert, Chief of Staff
Matt Burdick, Acting Director, Communication and Community Partnerships
Dale Buskirk, Director, Transportation Planning Division
Barclay Dick, Director, Aeronautics Division
Jim Dickey, Director, Public Transportation Division
Sam Elters, State Engineer
Win Holden, Publisher, Arizona Highways
Gail Lewis, Communication and Community Partnerships
John McGee, Chief Financial Officer
Victor Mendez, Director
Karen Mills, Special Projects
Stacey Stanton, Director, Motor Vehicle Division
Richard Travis, Deputy Director
Melissa Wynn, Budget & Strategic Planning

3.3 Research Council

The Research Council evaluates and rates proposals for new research, including pooled fund projects, thereby selecting new research projects. The Council monitors project activity and implementation and provides guidance to ATRC on the research program. The Council reviews technical advisory committee membership for research projects. The *Research Council Procedures* guide is contained in *Appendix B*.

Membership in the Research Council is voluntary. With the exception of the FHWA Arizona Division, there are no automatic or organizational positions on the Council. The current Research Council members are:

Julio Alvarado, Construction Group
Dale Buskirk, Director Transportation Planning Division
Frank Darmiento – chairman, Arizona Transportation Research Center
Jim Delton, State Materials Engineer

Jim Dickey, Director, Public Transportation Division
Doug Forstie, Deputy State Engineer
Lonnie Hendrix, State Maintenance Engineer
Karen King, Federal Highway Administration
Dan Lance, Deputy State Engineer
Mike Manthey, State Traffic Engineer
Sam Maroufkhani, Deputy State Engineer
Lisa Mattke, Information Technology Group
Scott Nodes, Transportation Technology Group
Jean Nehme, Bridge Group
Rick Powers, Globe District Engineer
Floyd Roehrich, Valley Project Management
Mary Viparina, Assistant State Engineer
Todd Williams, Environmental Services Director
Tim Wolfe, Phoenix Maintenance District Engineer

3.4 Research Emphasis Areas

Research emphasis areas are established by the ADOT research Steering Committee. Each research project is assigned to one of the seven emphasis areas.

There are currently seven research emphasis areas in the ATRC program. These are:

- Environment
- Intelligent Transportation Systems
- Maintenance
- Materials & Construction
- Planning, Administration, Motor Vehicle Division, Financial Management Services & Information Technology
- Structures
- Traffic & Safety

4.0 PROGRAM DEVELOPMENT

4.1 Budget

The primary source of funding for the ATRC research program is the Federal Highway Administration (FHWA). Under the Federal guidelines at least 25 percent of the SPR program funds must be used for research. Most of the SPR funds must be matched at a level of 20 percent with state funds. Some expenditures, such as the TRB correlation, the NCHRP contribution, and most pooled fund studies, do not require a state match and can be funded with 100 percent SPR funds. Recent Federal funding for the ATRC program has ranged from approximately $2.5 to $3 million per year.

The first step in developing a new fiscal year budget is to request a budget estimate from FHWA. The fiscal year (FY) 2007 budget items is shown in Table 1.

Table 1
ATRC Main Budget Categories

ID No.	Item	FY2007 Budget Amount
SPR-110	Library	$30,000
SPR-111	TRB Correlation Program	$140,000
SPR-112	Admin of Research	$30,000
SPR-113	Staff Salaries	$210,000
SPR-114	Technical Editing	$15,000
SPR-116	PRIDE Program	$50,000
SPR-117	LTAP	$68,000
SPR-118	TRQS Program	$10,000
SPR-120	Pooled Fund Studies	$50,000
SPR-124	Research Traffic Data Collection	$100,000
SPR-125	NCHRP contribution	$630,000
SPR-127	Small Budget Projects	$100,000
—	New Research Projects	$1,238,600
SPR-999	Contingency	$180,172

The TRB correlation is determined by TRB. The NCHRP contribution is 5.5 percent of the total SPR apportionment. The LTAP contribution is $68,000 per year. The current set-aside for small budget projects is $100,000. Other budget amounts can be adjusted from year to year.

Total funds in the ATRC budget are presented in the Annual Program Book. See *Section 4.4*.

Contingency Budget

The contingency budget is also used as transition funding during funding year closeouts, or Final Voucher. When a budget year is closed the budget for projects that are still active is moved to a later budget year. If there are no current accounts for the project in an active budget year a new TRACS number is created for the project in the latest budget year. The remaining funds for that project in the closed budget year are moved to the open (or newly created) budget year. However, the time from the point a budget year is no longer active, i.e., charges can no longer be made to the budget year, and the time funds can be moved to a later budget year is typically 3-4 months. If the project involved needs funds available to pay active charges during this period funds are borrowed from the contingency account for these payments. After the Final Voucher is complete and funds can be rolled into a later budget year the contingency fund is paid back. The contingency fund should maintain at least $200,000 to accommodate these rollover transfers. This is in addition to other contingency needs.

Match Funding

All projects, except NCHRP payments, TRB dues payments, and most pooled fund contributions require a 20% State funding match to receive the FHWA funds. This is accomplished by assigning State employee salaries and other State costs to the match. When possible, state universities and other state agencies are requested to contribute some or all of the 20% match for a project.

Non-Federal employee participation in projects can also be counted toward the match requirement.

Budget Tracking

At the beginning of each fiscal year funds are obligated from the proposed FHWA budget to support the annual ATRC research program. TPD sets up advanced ADOT construction funds to finance the program until FHWA funding becomes available (usually in 3-4 months). When the FHWA funding becomes available, payments from the advanced construction funds are paid back.

After a project is approved by the Research Council and FHWA the ATRC manager submits a request to the Transportation Planning Division (TPD) administrative group to set up a budget tracking number for the project. The research program tracking numbers for fiscal year 2006 are Federal project number 069 and TRACS suffix 18P. The project numbers advance by two digits each year: the Federal project number for FY2007 will be 071.

Pooled Fund Budget

Pooled fund contributions do not require a State match. The funding is listed in the ADVANTAGE system. However, the Transportation Planning Division (TPD) does not include this information in their monthly budget reports to ATRC because the funds are not obligated until they are designated by ATRC. A separate tracking system is required, outside the TPD spreadsheets, to track pooled fund contributions. The tracking steps include:

- Date funds are committed (on Pooled Fund web page)
- Date letter requesting obligation is sent to TPD
- Date confirmation of authorization is received from the Federal Highway Administration (FHWA) — form AZPR2X

The letter requesting that funds be obligated is sent to TPD in draft form for the TPD Director's signature. The letter identifies applicable projects and funding sources. The funding source is unobligated funds until the amount identified in the original budget presented in the Annual Program Book (*Section 4.4*) is fully allocated. Additional pooled fund obligations will come from transfers of obligated funds from other accounts, such as the contingency account. A sample draft pooled fund obligation letter is shown in *Appendix C*.

NCHRP Budget

NCHRP contributions do not require a State match. The funding is listed in the ADVANTAGE system. However, the Transportation Planning Division (TPD) does not include this information in their monthly budget reports to ATRC because the funds are not obligated until they are designated by ATRC. A separate tracking system is required, outside ADVANTAGE, to track NCHRP contributions.

4.2 Research Project Development

Proposals for research may be submitted to ATRC at any time. There is a link on the ATRC web site which can be used to submit a research proposal. Proposals may also be submitted to the ATRC manager or an ATRC Project Manager at any time. In addition to these informal processes, ATRC Project Managers conduct formal proposal solicitation activities for each emphasis area. These formal activities include meetings with key groups or individuals within ADOT and research emphasis area workshops.

Research Proposal Statements

Research problem statements must include all key information. The research problem statement outline, with these information items shown, is included in *Appendix D*.

Each proposed research statement is evaluated by an ATRC project manager. In some cases a problem statement may be developed in more than one emphasis area. For example, a study of wildlife road crossings could be included in the Environment emphasis area or the Traffic & Safety emphasis area. However, before a project is presented to the Research Council it will be listed in only one emphasis area. Project managers work with the individual or group submitting the research statement to refine it and insure that all the elements of the research statement are included in the document.

When a proposal has reached a point where a clear work scope has been developed, the ATRC Project Manager will send the draft work scope to Risk Management for review. The ATRC Project Manager will evaluate comments received from Risk Management and attempt to resolve all issues Risk Management may have with the proposal. The Project Manager will work with other affected entities, as necessary, to resolve concerns presented by Risk Management. Unresolved issues will be referred to the ATRC manager.

Proposed Implementation

Successful implementation of research results begins by considering potential implementation at the proposal development stage. Implementation is considered all through the research project cycle with the technical advisory committee (TAC) monitoring this effort. Final reports include a discussion of proposed implementation. At the completion of a research project, the project manager responsible for the project monitors implementation associated with the project for as long as implementation associated with the study continues. (See also *Research Implementation*.)

Champions and Sponsors

All ATRC research projects must have a Champion and a Sponsor. The Champion and Sponsor can be the same person.

CHAMPION

The Champion is a person who supports the project and assists and enables the research activity. The Champion must be identified in the research proposal.

SPONSOR

A Sponsor is a person with the authority to make a decision on the project research recommendations and carry the implementation forward if appropriate. The Sponsor has the authority to approve TAC members (subject to Research Council oversight) and the work plan (subject to ATRC oversight). All Sponsors must be ADOT employees unless an exception is approved by the Research Council. The Sponsor must be identified in the research proposal.

Proposed Technical Advisory Committee

The proposed TAC must be identified. This helps insure that the scope of the proposal has been carefully thought out. Refer to *Section 4.6* for more information on the development of TACs

Research Emphasis Area Workshop Voting Procedures

The following guidelines describe the requirements for research emphasis area project screening workshops.

1. Each project manager determines the number of votes authorized for each emphasis area under his or her direction.
2. Each vote is allocated to a specific entity, such as an ADOT group, FHWA, local jurisdiction, state agency, or university.
3. The ATRC manager reviews the proposed voting structure.

VOTING OPTIONS AT THE WORKSHOP

The project manager will determine the voting option for each workshop. This information should be provided prior to the workshop.

1. Allow only those present to vote.
2. Allow mail-in ballots.

ALTERNATIVE WORKSHOP STRATEGY
In place of conducting a formal workshop, a project manager can work with selected groups to develop research proposals. The following steps might be included.

1. Develop a formal working group for an emphasis area. This group can include all interested ADOT groups, FHWA, local jurisdictions, state agencies and universities.
2. The working group, rather than the workshop participants, votes on project proposals.

4.3 Research Project Selection Processes

Major Projects

Proposals in each research emphasis area are developed through open workshops or coordination with internal ADOT departments. For open workshops customized, weighted voting schemes are used in each emphasis area to rank the proposals. (See *Section 4.2*.) The ATRC manager reviews the top-ranked proposals from each emphasis area. If approved by the ATRC manager, these proposals move forward to the Research Council.

At the Research Council's option, a preliminary e-mail vote may be conducted to reduce the number of proposals. Typically, a maximum of five proposals are put forth by ATRC in each of the seven research emphasis areas. The Research Council typically chooses to reduce this number by e-mail to a maximum of three proposals per emphasis area for final consideration. However, the number of proposals brought forward is determined by the Research Council.

The final group of proposals is presented and discussed at a Research Council meeting. The Research Council then scores each proposal.

Scoring for both the e-mail evaluation and meeting evaluation is:
3 = high value to Arizona
2 = medium value to Arizona
1 = low value to Arizona
0 = no value to Arizona

Research Council member scores are added together for each project to yield the project's total score. The total score is the basis for ranking the proposals.

The proposals are then ranked based on the Research Council scores. Projects are selected for funding in order of scoring rank until the available funds are allocated.

Projects may be approved with budgets proposed in more than one fiscal year. This typically only occurs for large budget projects that take several years to complete. It is a means of spreading the cost so it does not have an adverse impact on a single year's budget. If a project is approved for multiple budget years it does not require approval in subsequent budget years. The funding in future budget years is allocated prior to selecting the new projects for that budget year.

For example, consider a project with a budget of $600,000, where $300,000 is allocated in the FY2007 budget and $300,000 in the FY2008 budget. When FY2008 projects are developed, $300,000 is removed from the available funding and assigned to the approved project prior to selecting new projects for FY2008.

Small Budget Projects

The ATRC small budget program is operated under the following guidelines:

- The annual budget for this program is $100,000. The amount can be increased at the discretion of the ATRC manager.

- The initial budget for each project cannot exceed $15,000.

- Projects may be proposed at any time during the year.

- After screening by ATRC, proposed small budget projects are presented to the Research Council for evaluation and vote (either by e-mail or at a meeting). Three options will be given to Research Council members if an e-mail ballot is used.
  (1) Approve or disapprove as is.
  (2) Approve or disapprove with comments.
  (3) Request discussion at a meeting before a decision is made.

  If a quorum of the Research Council votes the issue will be decided by a majority of those voting. If there is not a quorum or not a majority vote and there is interest by at least one Research Council member, follow up discussion will be held, either through e-mail or at a Research Council meeting.

- Proposals approved by the Research Council will be funded until the small budget funds are appropriated. If the annual budget is not used the funds will be transferred to other ATRC projects or activities.

TRQS Projects

Transportation Research Quick Study (TRQS) projects have a budget of $2,500 or less. The current annual budget for this program is $10,000. TRQS projects are authorized at the discretion of the ATRC manager. Proposals may be presented to the ATRC manager for TRQS funding by anyone in ADOT. The primary criteria are that the proposal have a research element and offer a benefit to ADOT.

Pooled Fund Projects

The current annual budget for pooled fund projects is $50,000. The Research Council will be consulted by e-mail on all pooled fund proposals of $10,000 or greater. Decisions on amounts under $10,000 will be made by ATRC unless the ATRC manager elects to elevate the decision to the Research Council. The decision will be based on a vote of the Research Council.

Voting for pooled fund evaluation will be based on the following scale:
3 = high value to Arizona
2 = medium value to Arizona
1 = low value to Arizona
0 = no value to Arizona

Proposals receiving an average score of 1.5 or above will be funded. A quorum of Research Council members must vote to have a valid decision.

4.4 FHWA Program (Annual Program Book) and Document Review

All expenditures of FHWA funds are subject to review and approval by FHWA. Each year ATRC prepares a research program plan, or *Annual Program Book*. The *Annual Program Book* describes proposed and existing research projects, activities and proposed budgets. The *Annual Program Book* for the upcoming fiscal year is submitted to FHWA during September, prior to the start of each Federal fiscal year.

Funding sources are included in this plan, including proposed FHWA funding amounts. Projects programmed with funds other than FHWA State Planning and Research funds are included in the *Annual Program Book* for information. Funds for new projects cannot be expended until FHWA approves the program. Changes from the program presented in the *Annual Program Book* require FHWA approval.

Small budget projects require individual FHWA review. The small budget program is presented as a lump sum item in the Annual Book. As individual projects are developed for the small budget program they each require FHWA review and approval before they can be programmed.

Similarly, an account is set up for pooled funds. When funds are obligated to a pooled fund the money is transferred out of the ATRC pooled fund account to FHWA.

Proposed changes to the program, i.e., changes in work scope, increases in budget and project cancellation are reviewed with FHWA prior to final action on the proposed change. Under Federal regulation 49 CFR 18.30(c)(1) any transfer that exceeds 10 percent of the current total approved budget requires FHWA prior approval. This can be accomplished through the use of e-mail communications.

<u>FHWA Program Approval and Research Proposal Cycle</u>

The approximate dates for development of the annual FHWA research program are shown in Table 2.

Table 2
FHWA Program Approval Cycle

APPROXIMATE DATES	ACTIVITY
7/1 – 4/1	Research proposal statements solicited, submitted and prepared
4/1 – 5/15	ATRC project managers select top 5 proposals in each of 7 research emphasis areas using workshops or meetings with key ADOT groups
5/15 – 5/21	ATRC manager reviews all proposals; final modifications to proposals completed
6/7	Research Council completes initial screen of initial proposals, reducing list to a maximum of 3 in each emphasis area
6/21	Research Council completes evaluation of final proposal resulting in a ranking of the list of final proposals
9/1	Submit draft research program book to FHWA with a copy to TPD Administrative Group
9/15	FHWA submits comments on draft program book to ATRC with a copy to TPD Administrative Group
9/20	ATRC submits final program book to TPD Administrative Group. ATRC submits request to TPD Administrative Group to prepare letter to FHWA authorizing program funds.
9/25	TPD Administrative Group submits project authorization request (AZPR2X Form), letter signed by TPD Director requesting funds and approval of work plan, and final work plan to FHWA.
10/1	FHWA approves work plan and authorizes funds.

4.5 Project Funding Setup and Modifications

Budget Approval and Setup

After FHWA approves the Federal elements of the program plan and authorizes the program funds the new projects in the plan are initiated. This begins with a request to the Transportation Planning Division (TPD) Administrative Group to set up an account for the project. At the beginning of each fiscal year funds are obligated from the proposed FHWA budget. TPD sets up advanced ADOT construction funds to finance these projects until FHWA funding becomes available (usually in 3-4 months). When the FHWA funding becomes available, payments from the advanced construction funds are paid back. This enables projects to begin as soon as FHWA approves the new program plan.

TPD sets up a TRACS (Transportation Accounting System) number for each project. The TRACS number reflects the fiscal year budget that the project is funded from. For example, TRACS number R0641 19P would refer to research project SPR-641 in budget year 19 or fiscal year 2007.

The status of each project budget is tracked in the ADOT ADVANTAGE accounting system. The system shows the original budget, the amount spent and the balance. Encumbered funds (funds set aside for a purchase order or other contractual agreement) are shown as funds already spent.

Budget Modifications

Project budget changes resulting from significant program or project modifications require FHWA approval. After approval is received, the requested change or fund transfer is sent to the TPD Administrative Group for action.

If a project amendment increases a project budget the funds for this increase are transferred from the appropriate account (usually the contingency account) into the project account. If a project is completed with a significant amount of money remaining in the project account these funds are transferred to the contingency account.

Funds cannot be transferred between fiscal years. Therefore, if additional funding were approved for a project the transfer would be from the contingency account in the same fiscal year as the project. In some cases it is necessary to set up a project account in another fiscal year in order to increase funding for a project. For example, if a project is approved in year 1 and additional funding is approved and available in year 2, then a new project number must be set up in year 2 for that project.

Budget Year Closeouts

Active budget years are closed out by the TPD Administrative Group and ADOT accounting after 3-5 years. The process begins with a review of all accounts in the subject budget year. Accounts with funding balances are evaluated to determine which accounts reflect active projects. For active projects with fund balances the balance may be transferred to either an existing account in a later budget year or a new account that is set up in the current fiscal year. For example, assume fiscal year 2001 is being closed out and project SPR-550, which is funded in that budget year, is still active and has a positive budget balance. Its FY2001 TRACS number would be R055013P. The funds can be transferred to a later budget year if an account exists for this project (e.g., R055015P for a FY2003 project) or funds could be moved to a new account in the current budget year (e.g., R055018P for FY2006).

4.6 Project Management

Champions and Sponsors

All ATRC research projects must have a Champion and a Sponsor (see *Research Project Development, Champions and Sponsors*).

Development of Technical Advisory Committees

Unless exempted by the ATRC manager, all projects must have a technical advisory committee (TAC). The project manager for a project develops a potential TAC for the project in consultation with the project Champion and Sponsor. The ATRC Project Manager is typically a member of the TAC. FHWA is invited to have a representative on all TACs. All recommended TACs are submitted to the ATRC manager for review. The ATRC manager informs the Research Council of all new TACs, allowing Research Council members an opportunity to suggest changes to any TAC.

Procurement Requirements

The project manager and TAC will decide what type of procurement mechanism and contract are appropriate for the project. On-call contracts and Joint Project Agreements (JPAs) are processed by the TPD administrative group. A Request for Proposal (RFP) or Request for Quotation (RFQ), which is usually in the form of an Electronic Request for Quotes (ERQ), is processed by the ADOT Procurement Group.

Selection panels must be created for RFPs or ERQs. The panel can be a single person for an ERQ, usually the project manager. State procurement rules govern these processes. The ATRC project manager must always be a member of the procurement selection panel unless the ATRC manager approves an exception.

Selecting Principal Investigators

Anyone may be the principal investigator for a project. Examples include, but are not limited to university professors or students, consulting companies, private individuals, a staff member from another government agency, an ADOT staff person (including ATRC staff). The project manager and TAC for a project select the principal investigator for a project.

Work Scope Development

The project manager, principal investigator and TAC develop the project work scope. Typically, the principal investigator will prepare a draft work scope. The project manager then works with the principal investigator to refine it before presenting it to the TAC for review. The work scope becomes a key component of the contract document

when contracts are required. For in-house principal investigators the project manager must clearly document the work scope in writing.

Monitoring Research Progress

The project manager carefully monitors the progress of each research project under his or her direction. This includes holding one or more progress meetings, regular telephone and written communications with the principal investigator, the TAC and other key individuals significant to the study.

Project monitoring also includes tracking project expenditures against the approved budget. The project manager must insure that expenditures correlate with progress. Project managers review all invoices associated with their project. Before an invoice can be paid it requires the approval of the project manager responsible for the corresponding project or the ATRC manager. When possible, payments are connected to research work products in the contract.

Report Preparation

A final report is required for all completed research. *Guidelines for Preparing ATRC Research Reports* (*Section 6.3*) describes the format and editorial standards required for ATRC reports. These guidelines are referenced in all research contract documents. The project manager insures that the principal investigator is familiar with these guidelines at the outset of the study. Each report is reviewed in accordance with the procedures outlined in the *Final Report Review Procedure* section.

Implementation Tracking

After a project is completed ATRC monitors the implementation of recommendations from the research. This activity continues as long as new implementation occurs. See *Section 7* for additional information on implementation.

4.7 Research Project Contracts

If a person outside ADOT is to be the principal investigator one of several contract mechanisms is used. The options include the following processes.

Request for Proposal

A request for proposal (RFP) can be used to solicit proposals on the work scope. This must be coordinated with the ADOT Procurement Group. It is required for new contracts of $50,000 or greater that do not use a Joint Project Agreement or Intergovernmental Agreement. A selection panel for the RFP must be chosen. The panel is usually the same group as the TAC, although this is not a requirement. The

ATRC project manager works with the TAC to determine the selection panel. The project manager must be a member of the Procurement selection panel unless exempted by the ATRC manager.

Request for Quotation (RFQ)

For projects of less than $50,000 a request for quotation (RFQ) can be used to select a principal investigator. This is an informal bid process and can usually be accomplished using the electronic request for quotes (ERQ) system. The project manager works with the TAC to decide on the selection process.

On-call Contractors

ADOT maintains several *on-call* lists of companies or individuals under contract to ADOT. The project manager, in conjunction with the TAC decides if use of an *on-call* contractor is appropriate. If so, several options are available to engage an *on-call* contractor. One is to solicit proposals from several companies on the *on-call* list and select a company based on these proposals. Another is to request a proposal from a single contractor and negotiate the tasks with that entity. Since these contractors are already under contract to ADOT the process to employ an *on-call* contractor is usually much quicker than creating an RFP or RFQ.

Joint Project Agreement

A joint project agreement (JPA) can be used to contract with other Arizona government entities, including state or local government agencies and universities. The project manager, in conjunction with the TAC decides if a JPA is appropriate for a project. JPAs for the research program are coordinated by the Transportation Planning Division administrative group.

4.8 Purchase Orders, Invoices, and Payments

Contract work is paid through purchase orders. The TPD Administrative Group creates a purchase order on request from ATRC. Invoices for all ATRC projects must be sent or forwarded to ATRC. The ATRC project manager or other staff person responsible for a contract must review each invoice for that contract. After approval by ATRC the invoice is forwarded to the TPD Administrative Group for processing and payment through the ADOT Accounting Group.

4.9 Project Cancellation Procedure

At times there is a need to cancel a project. Some of the reasons for canceling a project are that the project is no longer needed or viable, or the principal investigator

cannot complete the project. The steps required to cancel a project are described in this section.

The process begins by the Project Manager reviewing the project status with the project Sponsor, Champion and TAC. If all agree that the project should be cancelled, the Project Manager submits this recommendation to the ATRC Manager. The recommendation includes the rationale for recommending the project cancellation. If the ATRC Manager concurs with this decision he sends a letter to FHWA recommending the project cancellation. If FHWA concurs with this recommendation the project is cancelled and any remaining funds in the project budget are transferred to another account (usually the contingency account).

When preparing the rationale for project cancellation the Project Manager investigates any contract issues that may be involved in the project cancellation. Resolution of the contract issues is part of the rationale presented to the ATRC manager.

4.10 Project Log Database

ATRC maintains a Microsoft Access database for research projects. The database includes essential information about all active projects, and most completed projects dating back to 1998. Some of the information contained in the database includes:

- A discussion of the project background and objectives
- Total budget and the amount spent
- The Principal Investigator
- The project Champion, Sponsor and Technical Advisory Committee
- The status of the research
- Report publication status
- A discussion of project implementation

ATRC Project Managers are responsible for keeping information on their projects up to date in the database. The database uses nine tabs to organize the information: *Admin 1; Admin 2; Contract Info; Research; Publish – RiP; Implementation; Implementation Benefits; Implementation Issues* and *FHWA Rpt Items*. Examples of the current entry fields for the database are shown on the following pages.

Project Log Database: *Admin 1* Tab

ATRC PROJECT LOG

Sequence No. (Enter only the number part of the Project ID)	Project ID (SPR/AZ No.)	ADVANTAGE Nos.	ATRC Project Manager
595	SPR-595	R059516P	Steve Owen

Project Name	Emphasis Area
Real-time Adaptive Ramp Metering: Phase 1 - Simulation & Proof of Concept	ITS

BUDGET INFO

TRACS No. - Proj - FY
TRACS 16 - 065 - 2004
TRACS No. - Proj - FY
TRACS No. - Proj - FY
Additional Budget Years

Project Description and Background

ADOT's Freeway Management System is designed to apply "smart" ramp metering, taking into account the impacts on mainline freeway traffic flow. However, since its inception, smart real-time traffic-adaptive ramp metering has never been implemented.

Planned FMS controller upgrades, and existing communication infrastructure, would allow the full utilization of new ramp metering control strategies, such as the U of A's traffic-adaptive MILOS program, on extended freeway corridors. Such "smart" corridors will make ramp-metered traffic flows smoother and improve the operation of system interchanges and connecting corridors in the region. This project's corridor simulation modeling would validate the traffic-adaptive concept (this Phase 1), and will justify its early implementation when the FMS is upgraded (a Phase 2 effort, should it be shown beneficial in simulations).

Project Log Database: *Admin 2* Tab

ATRC PROJECT LOG

Project No.	Project Name
SPR-595	*Real-time Adaptive Ramp Metering: Phase 1 - Simulation & Proof of Concept*

Other Participants (ADOT and External Groups)

Transportation Technology Group
Transportation Technology Group
Traffic Engineering Group
Maricopa Association of Governments (MAG)

Champion	Sponsor
Tim Wolfe	Tim Wolfe

TAC Names and Organizations

Tim Wolfe-Transportation Technology Group (Champion)
Manny Agah-Transportation Technology Group – TOC Manager
Darrell Bingham-Transportation Technology Group
Mike Manthey-Traffic Engineering Group
Maricopa Association of Governments (MAG)
Traffic Engineers – Valley Cities
Alan Hansen-Federal Highway Administration

Principal Investigators

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Telephones
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E-mail
pitu@sie.arizona.edu

Project Log Database*: Contract Info* Tab

ATRC PROJECT LOG

Project No.	Project Name
SPR-595	*Real-time Adaptive Ramp Metering: Phase 1 - Simulation & Proof of Concept*

Initial ATRC Funds	Additional ATRC Funds	Notes on ATRC Added (change order) Funds
$100,000.00	$0.00	

Other Funds (Total)	Other Fund Sources
$0.00	Matches: $9,534 by U of A and $20,000 by Siemens ITS - not shown in calc

Funds Transferred Out	Comment - Fund Transfers (Project cancellation, closeout, etc.)
$0.00	

Total Project Funds	Amount Spent	Calculated Balance	Budget Info Date
$100,000.00	$92,859.17	$7,140.83	01/07/2007

CONTRACT - RFP/FOD/JPA Processing Dat

ENTER APPLICABLE DATE

Docs Submitted	Contract Complete	To ATRC Mgr	ATRC Mgr OK
	12/29/2004		

Contract Notes
JPA 05-015T dated 12-29-04

Project Log Database: *Research* Tab

ATRC PROJECT LOG

Status and Summary of Research

*Status: In progress, a consultant review of freeway management system design for target corridor; controllers installed by Siemens, bench testing of systems with ADOT FMS data completed. The proof of concept demo was *delayed* by software and interface issues, but it occurred in late March 06. Key goals met: establish two-way communications between TOC and upgraded ramp meter controllers; demonstrated functionality of MILOS model with real-time traffic detector data - thus enabling a Phase 2 operational test - as SPR 604.
**Report Draft 1was severely delayed but received on 10-9-06. Final draft was accepted by ATRC and sent to Tech

Percent Complete (Opt.)
99%

Project ID
SPR-595

Groups Involved

TTG - TOC, ITD Traffic Signals; MAG; MCDOT; Cities - Phoenix, Tempe, & Chandler

REPORT ACTION DATE

Draft Report Received	TAC Approval Complete	Approved by FHWA	Ed. Comments Received
10/09/2006	12/22/2006	01/04/2007	

Report Sent to TAC	Report Sent to FHWA	Report to Tech. Ed.	Report to Librarian
10/10/2006	12/29/2006	12/29/2006	

Project Log Database: *Publish – RiP* Tab

ATRC PROJECT LOG

Project No.	Project Name
SPR-595	*Real-time Adaptive Ramp Metering: Phase 1 - Simulation & Proof of Concept*

PUBLISHING TASK DATE

Report to Printer

Rpt Received from Printer

Report Distributed

Research Notes Distributed

Report Published on Web

RiP

Date Entered into RiP

Date Removed from RiP

Report Published ☐

Report Date

Project Log Database: *Implementation* Tab

ATRC PROJECT LOG

Project No.	Project Name
SPR-595	*Real-time Adaptive Ramp Metering: Phase 1 - Simulation & Proof of Concept*

IMPLEMENTATION

Status of Implementation

Phase 2 of this project - MILOS implementation and enhancement -has been funded by the Research Council for FY 06 (project SPR 604 to start in approximately September 2006). JPA documents were submitted by the University in early July, but match-funding questions, and the late completion of the 595 report, have delayed the new Phase 2 JPA. A second proposal budget was submitted on October 25 to allow the JPA to eventually be drafted. The JPA was sent to UA for signature on Dec 12th - still pending.

Entities Contacted by ATRC

Entities Contacted - Research Council approved SPR 604

Dates of Contact with Interested Entities

Request for Decision: 06/22/2005

Response Received: 07/01/2005

Follow Up (one year):

LAST REVIEW DATE: 01/07/2007

☐ No Further Implementation Planned

Project Log Database: *Implementation Benefits* Tab

ATRC PROJECT LOG

Project ID
SPR-595

Cost Savings

TBD in Phase 2 - SPR 604

Safety Benefits

TBD but expected to be substantial

Process Improvements

TBD

Other Benefits

TBD

Project Log Database: *Implementation Issues* Tab

ATRC PROJECT LOG

IMPLEMENTATION ISSUES

Project ID
SPR-595

Cost Impediments

Resource Impediments

University initially was unable to provide full match commitment to enable implementation as Phase 2, SPR 604 - resolved at the UA level, after extensive delays, due to lack of cooperation by ADOT-TPD management.

Political Impediments

Other Impediments

UA was delayed in completing the required predecessor research report for SPR 595

Recommended Follow-up Actions

Match budget restructuring demanded by TPD

Project Log Database*: FHWA Rpt Items* Tab

ATRC PROJECT LOG

Project No.	Project Name
SPR-595	*Real-time Adaptive Ramp Metering: Phase 1 - Simulation & Proof of Concept*

Expected Completion	Status	FHWA Contact	Emphasis Area Code
2-28-07	Draft	Hansen	ITS
ENTER: (Date) Ongoing Pending N/A	ENTER: Proposal IP (% complete), denotes In Progress Draft Complete Cancelled N/A		☑ FHWA Report Item

4.11 Research Support Activities

In addition to research projects, ATRC supports ADOT with *ad hoc* research efforts. These efforts range from literature searches to brief surveys of other states or organizations. These are not funded as separate programs but are performed by ATRC staff as part of their duties.

4.12 Pooled Fund Studies

The Transportation Pooled Fund (TPF) Program allows Federal, state, and local agencies and other organizations to combine resources to support transportation research studies. When significant or widespread interest is shown in solving a transportation-related problem the research, planning, and technology transfer activities to do so may be jointly funded by several Federal, state, regional, and local transportation agencies, academic institutions, foundations, or private firms as a pooled fund study.

To qualify as a pooled fund study, more than one state transportation agency, Federal agency, other agency such as a municipality or metropolitan planning organization, college, university or a private company must commit funds or other resources to conduct the research, planning, and technology transfer. If a subject has been studied previously, the new study should provide information that will complement or advance previous investigations of the subject matter. A Federal, state, regional, or local transportation agency may initiate pooled fund studies. Private companies, foundations, and colleges/universities may partner with any or all of the sponsoring agencies to conduct pooled fund projects.

See the *Section 4.3* for a discussion of how ADOT participation in pooled fund projects is considered.

<u>ADOT Sponsored Pooled Fund Studies</u>

To initiate an ADOT sponsored pooled fund study, the following steps should be followed.

1. Prepare a research proposal. The proposal should meet the same standards as all other ADOT research proposals, including identifying a Champion and Sponsor for the project.

2. The proposal must follow the same Research Council approval process as other research proposals.

3. After approval by the ADOT Research Council, ATRC submits the proposal and request for funding through the Arizona FHWA Division office. If it approves the

request the division office will submit the request to FHWA headquarters, along with its endorsement of the proposal. Upon submitting the proposal and request to establish the study a solicitation may be posted on the Transportation Pooled Fund (TPF) web site. A solicitation may remain posted on the TPF web site for up to 1 year.

4. For ADOT led studies, submission of a commitment to ADOT is an acknowledgement by a study partner that it will formally obligate funding to the pooled fund study. Commitments are made online at the TPF website. Each Federal, state, regional, or local agency uses the obligation forms that are generally used to obligate funds for research, planning, or technology innovation studies that use Federal funding sources. This process is the official obligation of funds on behalf of the study partners and the means by which these funds are made available for use for the pooled fund study. ADOT's Federal funds for pooled fund studies are obligated through the Arizona FHWA Division offices in the Fiscal Management Information System (FMIS). The Arizona FHWA office can confirm ADOT contributions to pooled funds.

5. To request reimbursement for funding Form PR-20, "Voucher for Work Performed Under Provisions of the Federal Aid and Federal Highway Acts, as Amended" should be submitted to the Arizona FHWA Division office. The Division Office then submits the voucher to FHWA's Turner-Fairbank Highway Research Center, to verify satisfactory program progress. Finally, the voucher is forwarded to FHWA Headquarters Finance Division for payment so proper distribution of study expenditures may be made among study partners.

5.0 PRIDE PROGRAM

5.1 PRIDE Program Background

The Product Resource Investment Deployment and Evaluation (PRIDE) program began in May 1985 when ADOT established the Policy for Field Test Requested by Outside Parties to address the increasing demands of technology and the limited resources of ADOT. This policy gave ATRC the responsibility for managing and documenting proposals for test sections submitted by vendors. A Product Evaluation Advisory Committee was established to evaluate the proposals and to recommend products or technologies to be considered for field evaluation.

The Product Evaluation Advisory Committee included an engineer from each ADOT District, a representative from the Materials Section, and one from ATRC. The first committee meeting was held in June 1985.

During December 1986, a full-time position was dedicated to the Product Evaluation Program and the evaluation of construction experimental features. In September of 1988, the system was further divided into the Product Evaluation and Experimental Projects Programs, with one engineer responsible for each program.

In 1991, the Evaluation Committee was separated into two committees: the General Highway Product Evaluation Advisory Committee and the Traffic Control New Product Evaluation Advisory Committee. The General Highway Product Evaluation Advisory Committee reviewed all highway construction-related materials. This committee included representatives from the following units: ADOT Districts, the Maintenance Section, Highway Plans Services, the Utility Section, the Materials Section, and ATRC. The Traffic Control New Product Evaluation Advisory Committee reviewed traffic control-related products. This committee included a representative from each of the following units: FHWA, ADOT Districts, the Urban Highways Section, the Traffic Engineering Section, Highway Plans Services, the Construction Section, the Maintenance Section, the Structures Section, the Materials Section, and ATRC. ATRC administered this program.

During November 1991, the State Engineer led a one-day discussion that included four District Engineers and all section heads of the Highways Division to review ADOT's product evaluation effort. Three task teams were established to create a policy to provide better coordination among units of the Highways Division.

On July 1, 1992, three committees were formed under the Highways Division Policy and Implementation Memorandum No. 92-08. This policy was replaced by ADOT Intermodal Transportation Division Policy and Implementation Memorandum No. 99-01, New Products Evaluation and Approval Process, effective December 1999.

The current PRIDE policy, SUP-9.01 PRODUCT RESOURCE INVESTMENT DEPLOYMENT AND EVALUATION (PRIDE) PROGRAM, became effective on July 18, 2002 and was revised and reissued on January 27, 2006. It provides for two Product Evaluation Committees (PECs), Materials (MatPEC) and Traffic Control (TCPEC). The PECs are responsible for establishing the operational policy for the new products evaluation and approval process under the PRIDE program. While each PEC has primary areas of responsibility, product evaluations often overlap these areas, requiring decisions from both committees on a product's acceptability. The PECs have the authority to approve or disapprove new products. Approved products are placed on the Approved Products List (APL). The committees have the authority to remove previously approved products from the APL that are later found to be unacceptable.

5.2 PRIDE Program Description

ATRC directs the PRIDE Program. The PRIDE Program is funded as part of the SPR Program. The PRIDE program coordinates the review and acceptance of new products for possible use by ADOT and maintains the Approved Products List (APL).

Outside contractors are used on an as-needed basis to support the PRIDE program. They may provide administrative support as well as perform evaluations of products submitted to the PRIDE program for review.

PRIDE Program Annual Report

The *PRIDE Program Annual Report,* published during the first quarter of each calendar year, summarizes the main activities of the PRIDE program for the previous calendar year. It also lists the MatPEC and TCPEC memberships and summarizes their actions.

6.0 LIBRARY, REPORTS AND DOCUMENTATION

6.1 Library

ATRC houses and operates the main ADOT library. The library is maintained by a full time librarian. The ATRC Library is open to ADOT employees, transportation faculty in Arizona universities, and Arizona local and county transportation staff.

The library catalogue is available on the Internet. The library collection currently includes nearly 30,000 entries, including over 60 journal and magazine subscriptions.

Acquisition Policy

The library welcomes recommendations for new books and periodicals; however, the librarian has sole responsibility for the selection and acquisition of library materials.

1. BOOKS AND REPORTS

The ATRC attempts to acquire all publications of the Arizona Department of Transportation. The Librarian uses the following criteria to decide acquisition of other items:

A. ADOT's need for the information,
B. Positive reviews and evaluations in accepted reviewing media and/or citation in specialized bibliographies or indexes,
C. The reputation of the publisher,
D. The author's reputation.
E. Availability at other area libraries (if the price is over $200.00)
F. Membership in a series (i.e., annual proceedings, standards) that the library has.
G. Whether the book is a new edition with revised information or a reprint.

2. MAGAZINES AND SERIALS

The Librarian uses the following criteria to decide magazine and serial purchases:

A. Likely usage by ADOT employees
B. Inclusion in indexing or abstracting by services available in the Library.
C. Frequency of citation in the literature.
D. Availability at other area libraries.
E. Multiple copies of serials will not be purchased.
F. Price and price increases.
G. Volume of requests for material from the serial *via* interlibrary loan.

3. GIFTS

The Library reserves the right to accept or discard any donated materials as it sees fit. It will not photocopy materials unless there is copyright clearance.

4. DISCARDS

The library considers discarding books when their information becomes obsolete, they are replaced by later editions, space restrictions require a smaller collection, the items are not used or they are damaged beyond repair.

Catalog

Library holdings are classified using the Library of Congress and Superintendent of Documents classification schemes. Their bibliographic information is entered into the Library database using DB/TextWorks software. This database can be accessed through the ATRC network and the Internet.

Circulation

ADOT employees, faculty of Arizona public colleges and universities, and transportation officials of Arizona cities and counties may borrow circulating items from the Library. Graduate students at Arizona public universities may request borrowing privileges via a letter on department letterhead signed by a faculty member.

All materials circulate except periodicals, reference items, computer software and manuals, indexes, ATRC vault reports, and the original, camera-ready copies of ATRC reports. Study guides for engineer-in-training and professional engineer tests circulate only to ADOT employees.

The checkout is documented by filling out a circulation card in the desired document. The Librarian records the information and tracks the loan. The standard loan period is one month. The borrower may renew an item two times, providing no one else has asked for it.

The borrower is responsible for returning items borrowed. The borrower may choose to have items sent to him and to return items *via* interagency mail or the U.S. Postal Service, however, the borrower is liable for the book if it is lost. The library will suspend or limit borrowing privileges of clients who do not return library materials. Borrowers who have kept items for more than six months will have their borrowing privileges suspended until the items are returned. They must replace or pay for lost, destroyed or damaged items. The library replaces books kept for more than one year and charges the replacement cost to the borrower. Borrowers who leave or change their current employment or student status must return all borrowed items to the library.

Clientele

The ATRC Library is open to the public, though some services are restricted.

Collection Description

The ATRC Library has nearly 30,000 books, magazines, videos and CDs. The collection focuses on transportation planning and engineering. Most of the collection is reports published by Federal and state transportation agencies. It also has professional society and commercial publications.

History

The ATRC Library was established in July 1989. In 1990 ATRC transferred from the Highways Division to the Transportation Planning Division. In 1995 it was transferred to the Intermodal Transportation Division. In 1997 it was transferred to the Director's Support Division. In 1999 it was transferred to the Transportation Planning Division, where it remains today.

Interlibrary Loan

The library borrows material from other libraries for ADOT staff through its interlibrary loan service. The library absorbs the charges for this service. Clients requesting an interlibrary loan must provide complete and accurate bibliographic information about the items they want to borrow.

Literature Searches

On request, the library will compile bibliographies on work-related issues for ADOT staff. The library uses various bibliographic databases—some free, some that charge—to find citations relevant to the research question. These databases include the Transportation Research Information Services (TRIS), the National Technical Information Service (NTIS), and the University of California Library catalog (Melvyl), all of which are free, and the Online Computer Library Center (OCLC), which charges.

Mission

The Library's mission is provide information to all ADOT employees, transportation related information services to the faculty and staff of the universities and colleges in Arizona, and to the local Arizona transportation departments (city or county). Limited services are provided to the public.

Ordering Books for Staff

The library can order printed material for ATRC staff or staff can order it directly. ADOT staff must order material directly. The exception is for free materials, which the Library will order for any ADOT staff. The Library will assist ADOT staff in purchasing printed material by providing publisher addresses and phone numbers; order forms (when available); and price information.

Other ADOT Collections

The Library supervises the entry of other ADOT section libraries into the Library database. This includes training on the use of the DB/TextWorks software and procedures to catalog the material. This assistance does not exceed four hours a week for a section. The section must have a purchased copy of the DB/TextWorks software and an on-site person designated as a library liaison to maintain the database. This on-site maintenance includes cataloging and entering new material; updating items when they are checked out and returned; deleting items when they are lost or not returned.

Outreach

The librarian provides tours of the library, staff presentations on Library services (usually given to groups in their work areas), and instruction in the use of such tools as the Library databases, indexes, and specific reference books.

Reference Services

The library responds to transportation-related reference questions from anyone, questions from ADOT staff receive the highest priority. ADOT staff may ask for information on any job-related topic. The library works with the requestor to determine the best way to deliver the answer: telephone calls, in-person visits to the library, fax, email, interagency mail or U.S. Postal Service.

6.2 Quarterly Reports to FHWA

A quarterly progress report is submitted to FHWA for the following periods:

- January 1 – March 31 (report dated April 1)
- April 1 – June 30 (report dated July 1)
- July 1 – September 30 (report dated October 1)
- October 1 – December 31 (report dated January 1)

The report includes a one-line summary of all active research projects, including budget information. The TPD administrative group provides the budget information is provided by the.

6.3 Research Document Guidelines

ATRC maintains guidelines governing the format and printing of its research reports. An archive of previous editions of the guidelines is maintained on the shared computer ATRC computer "G" drive at:
G:\TPD\ATRC\Team References\Rpt Guidelines Archive.

The guidelines are dated and maintained on the "G" drive so that contract requirements can be matched with the appropriate edition. For example, a contract signed on 12/1/2005 would be subject to the report guidelines in effect then. Modifications or updates to the guidelines prepared after the contract date do not affect the original contract.

A template for the four-page research notes that accompany all research reports is also on the "G" drive.

6.4 Final Report Review Procedure

All research contracts require the principal investigator to provide a draft report on the completed project and to respond to comments on the report. After a final report is reviewed and accepted by the Technical Advisory Committee for the respective research project the Project Manager sends the report to FHWA for its review. After the Project Manager addresses all comments from and resolves all concerns raised by the TAC and FHWA and receives FHWA approval, the document is ready for review by the technical editor.

The report is given to the ATRC manager who sends a printed copy and electronic copy to the technical editor. (This will normally be a company under contract to perform technical editing and review of ATRC reports.) The technical editor is requested to provide a cost estimate for the review of the subject report. Once a cost estimate is agreed to, the ATRC manager prepares and issues a Task Order for the technical editor to review the document. The technical editor's comments on the document are returned to ATRC in electronic form which the ATRC manager provides to the Project Manager. The Project Manager works with the principal investigator for the study to address questions or comments from the technical editor.

After the Project Manager is sure that all questions and edits from the TAC, FHWA, and the technical editor have been addressed, one copy of the report is printed by the ATRC project manager for review by the ATRC manager. After comments from the ATRC manager have been addressed, the report is ready for printing. Report printing is coordinated by the Project Manager with the ATRC Librarian.

Report distribution is directed by the ATRC Librarian. Final reports and research notes are posted on the ATRC web site by the ATRC Librarian.

6.5 Project Completion and Documentation

After a report has completed the review and printing process a project completion letter is sent to FHWA with eight copies of the report unless otherwise specified by FHWA. If a project is not completed or is cancelled, a letter explaining the action is sent to FHWA by the ATRC manager, with assistance from the Project Manager. Any remaining funds in such terminated projects are transferred to a contingency account or other appropriate ATRC account.

The files for the completed project are turned over to the TPD Administrative Group for filing. Files should comply with the ADOT records retention policy (MGT-9.09, *Records Retention and Disposition Schedule*).

6.6 ATRC Newsletter

ATRC publishes a quarterly newsletter. The newsletter is distributed electronically to ADOT, the AASHTO Research Advisory Committee list-serve distribution list, and other interested individuals.

6.7 ATRC Web Page

The current ATRC web page address is:
http://www.azdot.gov/TPD/ATRC

The web page includes the following:

- Background information.
- The annual program book.
- A list of research emphasis areas and descriptions of active projects.
- The form for submitting a research proposal.
- List of personnel.
- PRIDE program reference material and the application form.
- Publications that can be downloaded, including final reports, research notes, TRQS reports, newsletters, implementation reports, and PRIDE annual reports.
- The ATRC Library catalogue

The ATRC Librarian has the primary responsibility for maintaining the ATRC web page in coordination with the ADOT Information Technology Group.

6.8 TRIS and RiP Databases

The Transportation Research Board maintains two transportation research databases. The Transportation Research Information Services (TRIS) database is the world's largest and most comprehensive bibliographic resource on transportation information. It covers all modes and disciplines of transportation.

TRB also maintains the Research in Progress (RiP) online database. The system allows users in State Departments of Transportation to add, modify and delete information on their current research projects. Most of the RiP records are projects funded by Federal and state Departments of Transportation. University transportation research is also included.

The ATRC Librarian enters information on ATRC projects RiP database. This information is gathered from the ATRC project managers and completed research reports. The Librarian also submits reports to the TRB for inclusion in TRIS.

6.9 Annual Reports

In addition to the Annual Program Book submitted to FHWA (see *Section 4.4*) ATRC publishes two annual reports. The annual *Research Implementation Report* and the *PRIDE Program Annual Report* are both published during the first quarter of each calendar year. These reports cover activities that occurred during the previous calendar year. See *Section 7.1* for a discussion of the annual *Research Implementation Report* and *Section 5.1* for a description of the annual *PRIDE Program Annual Report*.

7.0 IMPLEMENATION AND PROGRAM EVALUATION

7.1 Research Implementation

One measure of the success of a research program is the extent to which results from the research are used. With this in mind, implementation is an important consideration from the initial research proposal development through completion of the research project.

All project proposals must discuss the proposed implementation of the research. Implementation is considered throughout the project. The final report must address proposed implementation. The project TAC considers the proposed implementation when it reviews the final report.

Each quarter Project Managers are required to check on all their projects that are being actively implemented and update the status of implementation for those projects. This information is entered into the Project Log database.

Implementation Tracking Form

ATRC uses a form to monitor implementation related to research projects. The form is a tool to assist the project manager in describing the status of implementation related to a research study. All ATRC project managers use the same form for implementation tracking. A copy of the form is included in *Appendix D*.

There are several strategies available for use of the form, including:

1. The project manager sending the form to key users with instructions for completing the form.
2. The project manager gathers pertinent information and completes the form.
3. A combination of the first two strategies, where the project manager works with the key users to complete the form.

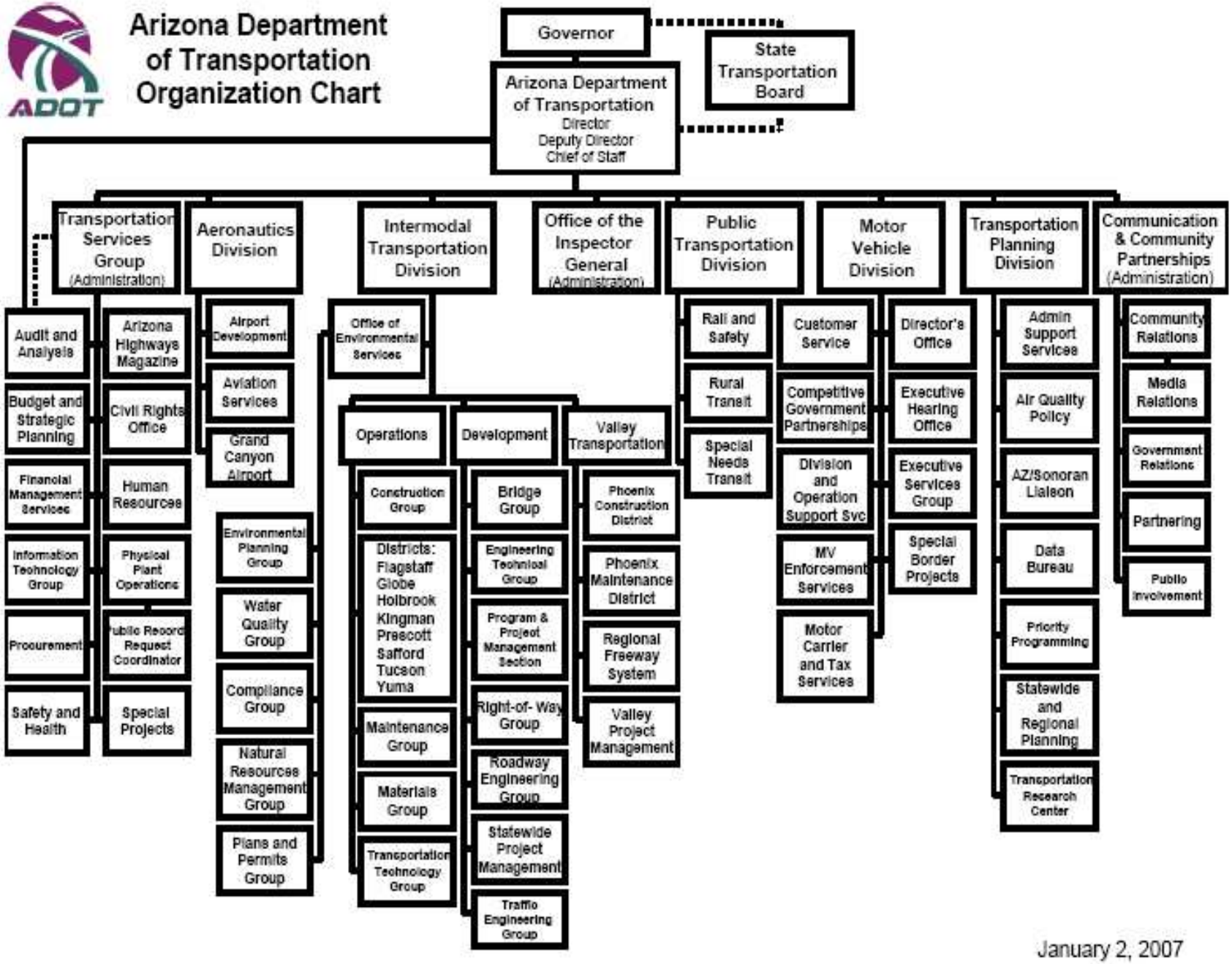
Research Implementation Report

An annual report on research implementation is published by ATRC for each calendar year from information compiled by ATRC Project Managers and logged into the Project Log database. The report reviews implementation that occurred during the previous calendar year on all ATRC research projects. Information may involve recently completed projects or projects completed in prior years that still have active implementation. The report is published in March for the previous calendar year.

APPENDIX A

ORGANIZATION CHARTS – ADOT and ATRC

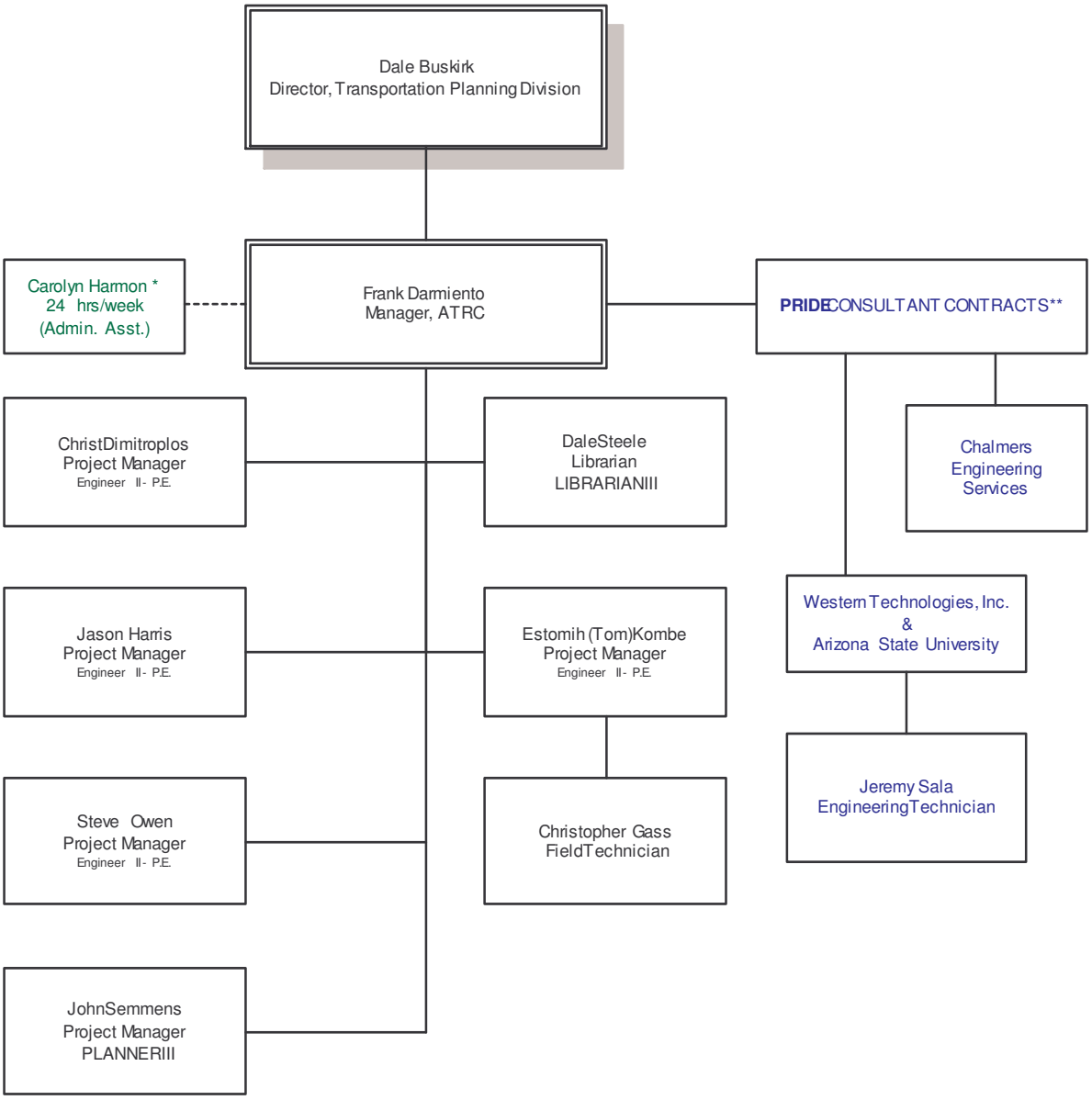
Arizona Department of Transportation Organization Chart



January 2, 2007

Arizona Transportation Research Center

Organization Chart - 1/1/2007



* Reports to TPD Administrative Group Manager

** Contractor

APPENDIX B

RESEARCH COUNCIL PROCEDURES

RESEARCH COUNCIL PROCEDURES

Introduction

This document outlines the standard practices and procedures of the Arizona Department of Transportation (ADOT) Research Council. The Research Council supports the ADOT research program which is directed by the Arizona Transportation Research Center (ATRC).

Research Council Membership

The Research Council evaluates and rates proposals for new research, including pooled fund projects, thereby selecting new research projects. The Council monitors project activity and implementation and provides guidance to ATRC on the research program. The Council reviews technical advisory committee membership for research projects.

Membership in the Research Council is voluntary. There are no automatic or organizational positions on the Council. FHWA always has the opportunity to serve on the Council. Members are appointed by the research Steering Committee based on recommendations from the ATRC manager.

Voting Procedures

The general procedure for Research Council voting, either by e-mail or at a meeting is that a quorum is required for a valid vote. A majority of those voting will decide the outcome of the vote. If there is not a majority supporting a position (due to abstentions or requests for further discussion) the issue is not decided.

Major Project Selection

The Research Council evaluates major research proposals presented by ATRC annually. This process typically employs an initial screen by e-mail to select the top candidate proposals in each of the seven research emphasis areas. The final candidate proposals are reviewed at a meeting during June of each year. The Research Council completes their evaluation of the final proposals at this meeting. The result of the individual Research Council member evaluations are totaled together to create a ranking for all the final proposals. The proposals are funded, beginning with the highest rated proposal, followed by the next highest rated proposals until all the available budget is allocated.

Small Budget Project Selection

The small budget research program is available for projects with budgets or $15,000 or less. The program's annual budget is $100,000. Proposals for small budget projects may be proposed at any time during the year.

Proposals recommended for consideration by the ATRC manager are sent to the Research Council for evaluation *via* e-mail unless ATRC believes the evaluation requires discussion at a Research Council meeting or a Research Council member requests that the proposal be discussed at a meeting. The Research Council is given three options on the e-mail ballot:

1. Approve or disapprove as is
2. Approve or disapprove with comments
3. Request discussion at a meeting before a decision is made.

Voting proceeds as described in the section on *Voting*.

If a quorum of the Research Council votes and there is not a majority of votes in favor of the proposal and one or more Research Members suggests further discussion then further dialogue will be pursued, either at a Council meeting or through e-mail.

Pooled Fund Selection Process

The Research Council is consulted by e-mail on all pooled fund proposals of $10,000 or greater. Decisions on amounts under $10,000 will be made by ATRC unless the ATRC manager elects to elevate the decision to the Research Council.

The decision is based on a 0-3 evaluation of each proposal. Those proposals receiving an average score of 1.5 or above from those Research Council members voting will be funded. A majority of Research Council members must vote to have a valid decision

Evaluation score definitions:
3 = high value to Arizona
2 = medium value to Arizona
1 = low value to Arizona
0 = no value to Arizona

TAC Review

The ATRC manager submits the names of all project technical advisory committee (TAC) members to the Research Council for review. Research Council members review these lists and consult with the respective ATRC project manager or ATRC manager with questions or comments.

Project Sponsor Requirements

All research project Sponsors will be ADOT employees unless an exception is approved by the Research Council. If an exception is considered the ATRC Manager will submit the recommendation to the Research Council for a vote.

APPENDIX C

POOLED FUND OBLIGATION LETTER SAMPLE

DRAFT OBLIGATION LETTER

DATE

Mr. Robert E. Hollis
Division Administrator
Federal Highway Administration
One Arizona Center, Suite 410
Phoenix, Arizona 85004-2285

Attention: Ms. Karen King

Through: Ms. Mary Hewitt [ACTING], Arizona Department of Transportation

Re: Pooled Fund Project Funding Obligations

The table below lists Pooled Fund projects that the Arizona Department of Transportation, through the Arizona Transportation Research Center, wishes to support through the State Planning and Research program. Please initiate the appropriate actions using Form PR-1240 to obligate funds as shown in the table.

Project No.	**Project Title**	**Amount**	**Fiscal Year**	**Program**
TPF-X(XXX)	*Title of Project*	$XX,XXX	FYXXXX	SPR-PL-1(XX)
TPF-X(XXX)	*Title of Project*	$XX,XXX	FYXXXX	SPR-PL-1(XX)
TPF-X(XXX)	*Title of Project*	$XX,XXX	FYXXXX	SPR-PL-1(XX)
	Total Obligation	0		

APPENDIX D

RESEARCH PROBLEM STATEMENT FORM

Project ID: XXX-1
Project Title: Title of the Proposed Research Project

Problem Description:
Provide background on the problem and summarize key issues related to the problem.

Literature Search Summary:
Summarize the literature search performed related to the problem.

Research Objectives:
Clearly state the objectives of the proposed research, i.e., what the research will accomplish or what type of information it will provide.

Affected Groups:
List the affected ADOT groups as well as external entities.

Anticipated Benefits:
Discuss the potential benefits of this research, e.g., improved safety, cost savings, more efficient processes, help in decision-making, etc.

Expected Implementation:
Describe how the research results will be implemented or deployed.

Project Champion (required): Person promoting project
Project Sponsor (required): Person with authority to move a project forward
Proposed Technical Advisory Committee:
List the proposed project TAC members.

ATRC Budget: $_____
Other Budget: $_____ (identify the source of funds)

Estimated Completion Date: __ months/years after initiation

Strategic Plan Correlation (FY07)	X
Maintenance	
Customer Service	
Program Delivery	
Regional Transportation System	
Technology	
Congestion Management	
Safety	
Environmental Stewardship	

[THIS COMPLETED FORM SHALL NOT EXCEED ONE PAGE. SUPPLEMENTAL INFORMATION MAY BE ATTACHED TO THIS FORM.]

APPENDIX E

IMPLEMENTATION TRACKING FORM

Arizona Transportation Research Center

SPR-XXX or AZ-XXX: Title of Report

Implementation Plan

Date: xx/xx/xxxx
Project Manager: NAME
Tel: PHONE NO.
Email: EMAIL ADDRESS

Implementation Actions

1. Briefly describe each recommendation
2. Indicate whether each recommendation is being or will be implemented
3. Discuss the actions taken in regard to the recommendation or the reason why the recommended action is not being taken
4. Indicate the current status of the recommendation.

1	2	3	4
Recommendation	**Yes/No**	**Rationale**	**Status**
* ENTER TEXT IN THESE ROWS * ADD OR DELETE ROWS AS NEEDED			

BENEFITS

Briefly describe the benefits anticipated or observed (for all of the following categories that apply) from implementing any of the recommendations. Whenever possible include quantified data (for example, dollars, time or lives saved).

Category	Benefits of Implementation
COST	
PROCESS	
SAFETY	
OTHER	

IMPEDIMENTS

If impediments exist that prevent implementation action, briefly discuss them in the appropriate category.

Category	Impediments to Implementation
COST	
RESOURCE	
OTHER	