

Project Investment Justification

Crash Records Modernization

DT23011

Department of Transportation

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1. GENERAL INFORMATION

PIJ ID: DT23011

PIJ Name: Crash Records Modernization **Account:** Department of Transportation

Business Unit Requesting: Motor Vehicle Division (MVD)

Sponsor: Eric Jorgensen **Sponsor Title:** MVD Director

Sponsor Email: ejorgensen@azdot.gov **Sponsor Phone:** (602) 712-8152

2. MEETING PRE-WORK



2.1 What is the operational issue or business need that the Agency is trying to solve? (i.e...current process is manual, which increases resource time/costs to the State/Agency, and leads to errors...):

A key element of the Arizona Department of Transportation (ADOT) mission is to reduce traffic fatalities and crashes on Arizona roadways. In support of this mission, ADOT maintains the safety of the state highway system and supports safety efforts on the local road system. This mission also includes developing and managing a Highway Safety Improvement Program (HSIP). A vital aspect of the HSIP is the ability to identify high crash locations, analyze these locations and identify potential countermeasures and then prioritize safety projects for possible programming into ADOT's Road Development Capital Program. The crash report is a primary input into ADOT's safety management business processes. Currently, crash reports are completed on electronic systems or on paper by law enforcement officers in the field.

Crash reporting is also required by Arizona statute (A.R.S. §28-670 - Accident report analysis). ADOT is required to publish accident statistics annually or more frequently. Federal statutes also require crash reporting, such as the Fatality Accident Reporting System (FARS), which is operated by the National Highway Traffic Safety Administration (NHTSA). All 50 states are required to enter or upload extensive data on each accident that results in a fatality. Currently, a FARS analyst at ADOT manually enters data into FARS from scanned images of the accident reports. Because of lack of staffing and an increase in fatal accidents, a backlog of six months of data has occurred, causing problems between NHTSA and ADOT. Crash reporting is also a requirement of many federal grants and roadway funding opportunities.

ADOT has several in-house developed legacy systems for crash reporting. Crash data is input into the Accident Location Identification Surveillance System (ALISS). ALISS is an internally developed software solution by ADOT's Information Technology Group (ITG). As it is about 20 years old, it has reached the end of its technical life. While it is based on .NET, SQL, C#, and is browser based, it does have technical debt as it is locked on to older unsupported versions of software. Another system, the Arizona Crash Information System (ACIS) is used by ADOT staff and other State and local agency stakeholders for safety program analysis and reporting. ALT (ADOT Location Tool) is another system that is used to identify the location for each crash. While the ADOT Location Tool is based on the ESRI Roads and Highways Linear Reference System, it is using an old copy of that data (from 2018) and thus is becoming less accurate. ESRI is the world's largest geographic information system software provider. ADOT uses their ArcGIS solution for GIS and mapping.

The Crash Records/FARS group processes about 120,000 crash records per year. Of those, approximately 100,000 are received electronically and 20,000 are received manually with 1/3 of the manual reports being mailed in and 2/3 of the reports being scanned/sent by Sharefile. Entry of the manual crash reports is labor intensive and a backlog of manual reports pending entry can delay the availability of crash information for analysis and reporting purposes.

The Crash Records/FARS group was recently transferred from ADOT's Transportation System Management and Operations (TSMO) Division to ADOT's Motor Vehicle Division (MVD). This group is responsible for receiving, entering, and editing all crash reports, which provide the basis for use in safety planning and crash reporting.

Because of the various challenges with the crash records systems, ADOT has initiated a project to modernize its safety management systems environment. ADOT conducted a safety management feasibility study in May and June 2022. From this feasibility study, three recommendations were identified that support this work:

- Replacement of ALISS with a next generation crash records database
- Integration of the ALISS replacement with FARS to allow for electronic reporting to FARS



- Evaluation and potential implementation of Optical Character Recognition (OCR) technology to reduce the effort required to enter manual crash reports.

2.2 How will solving this issue or addressing this need benefit the State or the Agency?

While numerous, the following is a list of expected high-level benefits from Crash Records Modernization:

- Reduce overall business risk through enhanced support for compliance with state and federal laws and regulations;
- Implement a technology platform that is scalable, flexible, and can be more easily maintained and improved;
- Implement a technology platform that is more user-configurable and consequently requires less effort by technical staff to implement system changes;
- Improve business processes by incorporating best practices inherent in the new system to achieve efficiencies and standardization that releases ADOT staff and staff of other agencies for other value-added work;
- Improve ADOT customer service support through increased vendor and employee self-service functionality for crash data-related activities;
- Employ state of the art OCR AI, as appropriate, to improve data quality and reduce both manual effort and report collection backlog;
- Provide standardized on-demand reporting; and
- Support electronic workflow.

2.3 Describe the proposed solution to this business need.

The technical approach will be custom development of the "middleware" application in MAX, combined with integration using web services to law enforcement records management systems for input, web services to location validation tools, and output to business intelligence software for basic reporting and dashboards.

The project will leverage key components of the existing MAX and AZ MVD Now solutions wherever possible, and design and development patterns from the Motor vehicle Modernization (MvM) program will be followed for the Crash Records solution. Crash records will be sent via web services or scanned and electronically read for input to the Crash Records solution. Crash Records may also be manually entered and/or corrected into a MAX user interface and will be stored in MAX databases.

Dashboards, reports, and queries will be produced from a business intelligence tool (Microsoft Power BI) onto the AZ MVD Now portal.

MAX and AZ MVD Now is built on the Microsoft .NET and Azure technical stacks. Cloud hosting is exclusively used with Microsoft Azure Government Cloud. Numerous Azure products are used. One potential opportunity is to use the Azure Cognitive Services that includes the Azure OCR Read product which is an artificial intelligence/machine learning tool for extracting text from images.

2.4 Has the existing technology environment, into which the proposed solution will be implemented, been documented?

Yes



2.4a Please describe the existing technology environment into which the proposed solution will be implemented.

2.5 Have the business requirements been gathered	, along with any technology	requirements that have been
identified?		

Yes

2.5a Please explain below why the requirements are not available.

3. Pre-PIJ/Assessment

3.1 Are you submitting this as a Pre-PIJ in order to issue a Request for Proposal (RFP) to evaluate options and select a solution that meets the project requirements?

No

- 3.1a Is the final Statement of Work (SOW) for the RFP available for review?
- 3.2 Will you be completing an assessment/Pilot/RFP phase, i.e. an evaluation by a vendor, 3rd party or your agency, of the current state, needs, & desired future state, in order to determine the cost, effort, approach and/or feasibility of a project?

Yes

3.2a Describe the reason for completing the assessment/pilot/RFP and the expected deliverables.

ADOT conducted a feasibility study in May and June 2022. The feasibility study made a number of recommendations for modernizing ADOT's safety management systems.

3.2b Provide the estimated cost, if any, to conduct the assessment phase and/or Pilot and/or RFP/solicitation process.

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3.2e Based on research to date, provide a high-level cost estimate to implement the final solution.

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4. Project

4.1 Does your agency have a formal project methodology in place?

Yes

4.2 Describe the high level makeup and roles/responsibilities of the Agency, Vendor(s) and other third parties (i.e. agency will do...vendor will do...third party will do).

ADOT Project Manager and MVD MvM Team - responsible for the budget and coordination of the project

ADOT Crash Records Staff - provide subject matter expertise

ADOT Sponsor - responsible for the approval of the project deliverables and issue resolution



4.3 Will a PM be assigned to manage the project, rega	rdless of whether internal or vendor provided?
Yes	
4.3a If the PM is credentialed, e.g., PMP, CPM, State of	ertification etc., please provide certification information.
4.4 Is the proposed procurement the result of an RFP	solicitation process?
No	
4.5 Is this project referenced in your agency's Strategic	c IT Plan?
Yes	
	ed Start Date and End Date of the project, and the supportinន្
Milestones of the project?	
Yes	
5.2 Provide an estimated start and finish date for impl	ementing the proposed solution.
Est. Implementation Start Date	Est. Implementation End Date
2/27/2023 12:00:00 AM	5/1/2024 12:00:00 AM
5.3 How were the start and end dates determined?	
Based on project plan	
	nes of the project, e.g., acquire new web server, develop

software interfaces, deploy new application, production go live, and estimate start/finish dates for each, if known.

Milestone / Task	Estimated Start Date	Estimated Finish Date		
TraCs/RMS Integrations	02/27/23	06/09/23		
AI/ML OCR Integration	02/27/23	05/12/23		
Core Crash Records Design & Development	02/27/23	11/03/23		
ESRI ArcGIS Integration	07/03/23	10/06/23		
FARS Screening Development	08/07/23	11/24/23		
FARS Electronic Data Transfer Integration	09/04/23	02/16/24		
QA/UAT	10/02/23	04/05/24		
ACIS Data Transfer	11/27/23	02/09/24		
Data Conversion	02/26/24	04/26/24		
Training	02/26/24	04/12/24		



Deployment	04/01/24	04/26/24		
Closing (Final Payments, etc.)	04/01/24	05/01/24		

5.4 Have steps needed to roll-out to all impacted parties been incorporated, e.g. communications, planned outages, deployment plan?
Yes
5.5 Will any physical infrastructure improvements be required prior to the implementation of the proposed solution. e.g., building reconstruction, cabling, etc.?
No
5.5a Does the PIJ include the facilities costs associated with construction?
5.5b Does the project plan reflect the timeline associated with completing the construction?
6. Impact
6.1 Are there any known resource availability conflicts that could impact the project?
Yes
6.1a Have the identified conflicts been taken into account in the project plan?
Yes
6.2 Does your schedule have dependencies on any other projects or procurements?
No
6.2a Please identify the projects or procurements.
6.3 Will the implementation involve major end user view or functionality changes?
Yes
6.4 Will the proposed solution result in a change to a public-facing application or system?
Yes

7. BUDGET

7.1 Is a detailed project budget reflecting all of the up-front/startup costs to implement the project available, e.g, hardware, initial software licenses, training, taxes, P&OS, etc.?

Yes



7.2 Have the ongoing support costs for sustaining the proposed solution over a 5-year lifecycle, once the project is complete, been determined, e.g., ongoing vendor hosting costs, annual maintenance and support not acquired upfront, etc.?
Yes
7.3 Have all required funding sources for the project and ongoing support costs been identified?
Yes
7.4 Will the funding for this project expire on a specific date, regardless of project timelines?
No
7.5 Will the funding allocated for this project include any contingency, in the event of cost over-runs or potential changes in scope?
No
8. Technology
8.1 Please indicate whether a statewide enterprise solution will be used or select the primary reason for not choosing an enterprise solution.
There is not a statewide enterprise solution available
8.2 Will the technology and all required services be acquired off existing State contract(s)? Yes
8.3 Will any software be acquired through the current State value-added reseller contract?
No
8.3a Describe how the software was selected below:
8.4 Does the project involve technology that is new and/or unfamiliar to your agency, e.g., software tool never used before, virtualized server environment?
No
8.5 Does your agency have experience with the vendor (if known)?
Yes
8.6 Does the vendor (if known) have professional experience with similar projects?
Yes
9.7 Doos the project involve any coordination agrees multiple very days?
8.7 Does the project involve any coordination across multiple vendors? No



8.8 Does this project require multiple system interfaces, e.g., APIs, data exchange with other external application systems/agencies or other internal systems/divisions?
Yes
8.9 Have any compatibility issues been identified between the proposed solution and the existing environment, e.g., upgrade to server needed before new COTS solution can be installed?
No
8.9a Describe below the issues that were identified and how they have been/will be resolved, or whether an ADOA-ASET representative should contact you.
8.10 Will a migration/conversion step be required, i.e., data extract, transformation and load?
Yes
8.11 Is this replacing an existing solution?
Yes
8.11a Indicate below when the solution being replaced was originally acquired.
ALISS was custom built over 20 years ago.
8.11b Describe the planned disposition of the existing technology below, e.g., surplused, retired, used as backup, used for another purpose:
ALISS will be retired at the end of this project.
8.12 Describe how the agency determined the quantities reflected in the PIJ, e.g., number of hours of P&OS, disk capacity required, number of licenses, etc. for the proposed solution?
Used both top-down and bottom-up analysis of the number of hours for P&OS.
Technical analysis of growth in hosting virtual servers and storage was reviewed for increased cloud hosting costs.
8.13 Does the proposed solution and associated costs reflect any assumptions regarding projected growth, e.g., more users over time, increases in the amount of data to be stored over 5 years?
Yes
8.14 Does the proposed solution and associated costs include failover and disaster recovery contingencies?
Yes
8.14a Please select why failover and disaster recovery is not included in the proposed solution.
8.15 Will the vendor need to configure the proposed solution for use by your agency?
No



8.15a Are the costs associated with that configuration included in the PIJ financials?

8.16 Will any app dev or customization of the proposed solution be required for the agency to use the project in the current/planned tech environment, e.g. a COTS app that will req custom programming, an agency app that will be entirely custom developed?
Yes
8.16a Will the customizations inhibit the ability to implement regular product updates, or to move to future versions?
No
8.16b Describe who will be customizing the solution below:
The applications will be custom-developed using the core foundation and technologies of MVD's MAX and AZ MVD Now applications, by the same team that developed the aforementioned applications.
8.16c Do the resources that will be customizing the application have experience with the technology platform being used, e.g., .NET, Java, Drupal?
Yes
8.16d Please select the application development methodology that will be used:
Agile/Scrum
8.16e Provide an estimate of the amount of customized development required, e.g., 25% for a COTS application, 100% for pure custom development, and describe how that estimate was determined below:
75%
8.16f Are any/all Professional & Outside Services costs associated with the customized development included in the PIJ financials?
Yes
8.17 Have you determined that this project is in compliance with all applicable statutes, regulations, policies, standards & procedures, incl. those for network, security, platform, software/application &/or data/info found at aset.az.gov/resources/psp?
Yes
8.17a Describe below the compliance issues that were identified and how they have been/will be resolved, or whether an ADOA-ASET representative should contact you:
8.18 Are there other high risk project issues that have not been identified as part of this PIJ?
No
8.18a Please explain all unidentified high risk project issues below:



9. SECURITY

9.1 Will the proposed solution be vendor-hosted?
Yes
9.1a Please select from the following vendor-hosted options:
Commercial data center environment, e.g AWS, Azure
9.1b Describe the rationale for selecting the vendor-hosted option below:
This is the same location where all of MAX and AZ MVD Now is and has been hosted.
9.1c Has the agency been able to confirm the long-term viability of the vendor hosted environment?
Yes
9.1d Has the agency addressed contract termination contingencies, e.g., solution ownership, data ownership, application portability, migration plans upon contract/support termination?
Yes
9.1e Has a Conceptual Design/Network Diagram been provided and reviewed by ASET-SPR?
Yes
9.1f Has the spreadsheet located at https://aset.az.gov/arizona-baseline-security-controls-excel already been completed by the vendor and approved by ASET-SPR?
No
9.2 Will the proposed solution be hosted on-premise in a state agency?
No
9.2a Where will the on-premise solution be located:
9.2b Were vendor-hosted options available and reviewed?
9.2c Describe the rationale for selecting an on-premise option below:
9.2d Will any data be transmitted into or out of the agency's on-premise environment or the State Data Center?
9.3 Will any PII, PHI, CGIS, or other Protected Information as defined in the 8110 Statewide Data Classification Policy be transmitted, stored, or processed with this project?
Yes



9.3a Describe below what security infrastructure/controls are/will be put in place to safeguard this data:

Cloud hosted using Microsoft Azure Government Cloud will be used, as it will be integrated to MVD's MAX and AZ MVD Now applications.

10. Areas of Impact

Application Systems
New Application Development
Database Systems
MS SQL Server
Software
Hardware
Hosted Solution (Cloud Implementation)
Microsoft Azure
Security
Telecommunications
Enterprise Solutions
Contract Services/Procurements



11. FINANCIALS

Description	PIJ Category	Cost Type	Fiscal Year Spend	Quantity	Unit Cost	Extended Cost	Tax Rate	Тах	Total Cost
Professional & Outside Services	Professio nal & Outside Services	Develop ment	1	1	\$267,378	\$267,378	0.00 %	\$0	\$267,378
Cloud Hosting	Other	Develop ment	2	1	\$10,500	\$10,500	0.00 %	\$0	\$10,500
Professional & Outside Services	Professio nal & Outside Services	Develop ment	2	1	\$668,442	\$668,442	0.00 %	\$0	\$668,442
Operations and Support	Professio nal & Outside Services	Operatio nal	2	1	\$40,590	\$40,590	0.00 %	\$0	\$40,590
Cloud Hosting	Other	Operatio nal	3	1	\$66,150	\$66,150	0.00 %	\$0	\$66,150
Operations and Support	Professio nal & Outside Services	Operatio nal	3	1	\$255,717	\$255,717	0.00 %	\$0	\$255,717
Cloud Hosting	Other	Operatio nal	4	1	\$69,458	\$69,458	0.00 %	\$0	\$69,458
Operations and Support	Professio nal & Outside Services	Operatio nal	4	1	\$268,503	\$268,503	0.00 %	\$0	\$268,503
Cloud Hosting	Other	Operatio nal	5	1	\$72,930	\$72,930	0.00 %	\$0	\$72,930
Operations and Support	Professio nal & Outside Services	Operatio nal	5	1	\$281,928	\$281,928	0.00 %	\$0	\$281,928

Base Budget (Available)	Base Budget (To Be Req)	Base Budget % of Project	
\$2,257,046	\$0	100%	
APF (Available)	APF (To Be Req)	APF % of Project	
\$0	\$0	0%	
Other Appropriated (Available)	Other Appropriated (To Be Req)	Other Appropriated % of Project	
\$0	\$0	0%	
Federal (Available)	Federal (To Be Req)	Federal % of Project	
\$0	\$0	0%	
Other Non-Appropriated (Available)	Other Non-Appropriated (To Be Req)	Other Non-Appropriated % of Project	
\$0	\$0	0%	

Total Budget Available	Total Development Cost
\$2,257,046	\$946,320
Total Budget To Be Req	Total Operational Cost
\$0	\$1,055,276
Total Budget	Total Cost
\$2,257,046	\$2,001,596



12. Project Success

Please specify what performance indicator(s) will be referenced in determining the success of the proposed project (e.g. increased productivity, improved customer service, etc.)? (A minimum of one performance indicator must be specified)

Please provide the performance objective as a quantifiable metric for each performance indicator specified. **Note:** The performance objective should provide the current performance level, the performance goal, and the time period within which that performance goal is intended to be achieved. You should have an auditable means to measure and take corrective action to address any deviations.

Example: Within 6 months of project completion, the agency would hope to increase "Neighborhood Beautification" program registration by 20% (3,986 registrants) from the current registration count of 19,930 active participants.

Performance Indicators

Performance Indicators:

- Reduction in FARS backlog from 8 months to 2 months within one year of project completion.
- Reduction in Crash Records backlog from 4 months to 1 month within one year of project completion.
- Reduce manual entry from 16% of crash reports to 12% within 6 months of project completion. An additional 8% of reports manually entered will have at least 75% of information automatically populated (outcome dependent on effectiveness of OCR AI).

13. Conditions

Conditions for Approval

Should development costs exceed the approved estimates by 10% or more, or should there be significant changes to the proposed technology scope of work or implementation schedule, the Agency must amend the PIJ to reflect the changes and submit it to ADOA-ASET, and ITAC if required, for review and approval prior to further expenditure of funds.

Monthly reporting on the project status is due to ADOA-ASET no later than the 15th of the month following the start of the project. Failure to comply with timely project status reporting will affect the overall project health. The first status report for this project is due on April 15, 2023.

14. Oversight Summary

Project Background

The Department of Transportation (ADOT) is a multimodal transportation agency serving one of the fastest-growing areas of the country. ADOT is responsible for planning, building and operating a complex highway system in addition to building and maintaining bridges and the Grand Canyon Airport who has jurisdiction over state roads, state airports, and the registration of motor vehicles and aircraft. The Agency has been creating a system to improve the quality of life and provide a safe, efficient, cost-effective transportation solution.

ADOT MVD issues driver licenses, identification cards and vehicle registrations, among other things. ADOT MVD strives to make these transactions as quick, simple and secure as possible, fulfilling its vision of getting Arizona motorists out of the line and safely on the road.

Currently, a FARS analyst at ADOT manually enters data into FARS from scanned images of the accident reports.



Because of lack of staffing and an increase in fatal accidents, a backlog of six months of data has occurred, causing problems between NHTSA and ADOT.

The proposed solution addresses the stated problem. The proposed project aligns with the budget unit's Strategic IT Plan; and the proposed solution complies with statewide IT standards.

Business Justification

The adopting of the new solution as follows:

- Reduction in FARS backlog from 8 months to 2 months within one year of project completion.
- Reduction in Crash Records backlog from 4 months to 1 month within one year of project completion.
- Reduce manual entry from 16% of crash reports to 12% within 6 months of project completion. An additional 8% of reports manually entered will have at least 75% of information automatically populated (outcome dependent on effectiveness of OCR AI).

While numerous, the following is a list of expected high-level benefits from Crash Records Modernization:

- Reduce overall business risk through enhanced support for compliance with state and federal laws and regulations;
- Implement a technology platform that is scalable, flexible, and can be more easily maintained and improved;
- Implement a technology platform that is more user-configurable and consequently requires less effort by technical

staff to implement system changes;

- Improve business processes by incorporating best practices inherent in the new system to achieve efficiencies and standardization that releases ADOT staff and staff of other agencies for other value-added work;
- Improve ADOT customer service support through increased vendor and employee self-service functionality for crash

data-related activities;

- Employ state of the art OCR AI, as appropriate, to improve data quality and reduce both manual effort and report collection backlog;
- Provide standardized on-demand reporting; and
- Support electronic workflow.

There is sufficient sponsorship and support by budget unit leadership, ADOA-ASET spoke with the project sponsor as

well as the PIJ submitter.

Implementation Plan

The solution will be Vendor-hosted, in ADOT's Microsoft Azure GovCloud environment.

ADOT Project Manager and MVD MvM Team - responsible for the budget and coordination of the project ADOT Crash Records Staff - provide subject matter expertise

ADOT Sponsor - responsible for the approval of the project deliverables and issue resolution

The PM will be Bri Ferguson

How many interfaces for this project?

- 5 from TraCS and other records management systems to electronically receive crash reports from law enforcement agencies, ADOT Location Tool or ESRI ArcGIS for location data validation, ACIS for output of crash data for reporting and analysis, and electronic data transfer to NHTSA's Fatality Accident Reporting System (FARS).
- 1. Can you explain more about the ACIS Data Transfer and Data Conversion.



Response: ACIS Data Transfer will be de-identifying and transferring data from the new Crash Records system to ADOT's Data Warehouse where it is used by the Arizona Crash Information System (ACIS) - primarily a Tableau BI reporting app.

Data conversion would be to convert crash records from ALISS (legacy system) to the new Crash Records system (the amount of data to be converted will be decided later, but likely would include at least the YTD crash records).

2. ACIS Data Transfer and Data Conversion seem to happen during QA/UAT. Is that going to cause a problem with the results of the testing?

Response: No, that will not be a problem with the results of the testing. Testing will be planned and staggered appropriately.

ADOA-ASET believes that the business unit is competent to carry out the project successfully; and supported by sponsorship and budget unit leadership.

Vendor Selection

This application will be custom-developed using the core foundation and technologies of MVD's MAX and AZ MVD Now applications, by the same team that developed the aforementioned applications.

Oversight acknowledges that there are not three vendor quotes, because of the statement above; but ADOT aligns with the budget unit's Strategic IT Plan and follows the Statewide cloud first policy.

The report identifies the planned spending for fiscal year 2023 in relation to the Motor vehicle division (MvM) project. This revision was requested after ADOA received a Project Investment Justification (PIJ) from ADOT for the Crash Records Modernization project they anticipate beginning in late February 2023.

Budget or Funding Considerations

The project development and implementation are accounted

for in the following manner:

Emily Gross

Base Budget (Available) = 100% \$ 2,257,046.00

Total Project: \$ 2,257,046.00

Available in the agency's FY23 budget.

MvM Development-Enhancements category of eGov (ADOT Technology Reserve Fund).

15. PIJ REVIEW CHECKLIST

gency Project Sponsor
ic Jorgensen
gency CIO (or Designee)
eve West
gency ISO (or designee)
nomas Branham
SPB Representative
SET Engagement Manager
SET SPR Representative



Agency SPO Representative		
Agency CFO		
Kristine Ward		