Crash Data System Replacement and Process Improvement

Concept of Operations

April 2023

Crash Analysis and Reporting Unit
Transportation Data Section
Policy, Data and Analysis Division
Oregon Department of Transportation

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1 Scope

1.1 Project Background

Crash data in Oregon is used in a wide variety of ways, from solving complex engineering problems to answering media requests, to supporting in-depth safety planning and crash analyses. It serves a critical role in decision-making across all levels of state and local governments, including where and how to invest in transportation improvements. It is critical for decision makers to have access to timely crash data, and for several years the existing processes and systems have been unable to meet expected deadlines. The current crash data processes and systems in use at ODOT hinder the timely collection and dissemination of this data, and the self-service crash data tools make it difficult to consume the data. Due to the lack of electronic submission options, the crash reports received can be incomplete and difficult to comprehend. Driver and Motor Vehicle Services (DMV) Crash Reporting Unit (CRU) processes can be time-consuming, resulting in a delay in the transfer of crash reports to the Crash Analysis and Reporting (CAR) Unit which can negatively impact the ability for key CAR Unit staff to meet federal crash data reporting requirements. Furthermore, the Crash Data System (CDS), the main system used for crash data coding, management, and reporting, is based on aged, unsupported technology that prevents any meaningful system improvements from being implemented. As a result, there is difficulty in identifying and acquiring resources to make system updates and perform maintenance on the CDS, as well as some of the main crash data tools, that are not being addressed. The current systems in use scarcely meet current business needs and have no way to meet the business needs of the future.

As a result, the CAR Unit and other key Transportation Data Section staff developed a Concept of Operations (ConOps) document as the first step of the CDS Replacement and Process Improvement Project. The ConOps is a foundational document that details the current systems and processes surrounding crash data collection, management, and reporting, as well as identifies deficiencies with the systems and processes, user needs which should be fulfilled, and a high-level proposal for a new system and new components to existing systems that would modernize systems and processes and improve the overall timeliness of the release of crash data for distribution and reporting.

1.2 Acronyms

Table 1-1 Acronyms Used in the ConOps

Acronym	Definition
API	Application Programming Interface
ARTS	All Roads Transportation Safety
BAC	Blood Alcohol Content
BIDW	Business Intelligence and Data Warehouse (Unit)
CAR Unit	Crash Analysis and Reporting (Unit)
CAV	Connected Autonomous Vehicle
CDA	Crash Data Analyst
CDS	Crash Data System
CDRT	Crash Data Reporting Technician
CDT	Crash Data Technician
CDV	Crash Data Viewer
CLT	Crash Locator Tool
CMV	Commercial Motor Vehicle
COTS	Commercial Off-the-Shelf
CRU	Crash Reporting Unit
DMV	Driver and Motor Vehicle Services
EAS	Enterprise Application Services

Acronym	Definition
EASIE	Equitable Active Safety Improvements Evaluation (project)
EDW	Enterprise Data Warehouse
EMS	Emergency Medical Services
FACS-STIP	Features, Attributes, and Conditions Survey and Statewide Transportation Program
FARS	Fatality Analysis Reporting System
FDT	Fatal Data Technician
FMCSA	Federal Motor Carrier Safety Administration
FME	Feature Manipulation Engine
GIS	Geographic Information Services
LEDS	Law Enforcement Data System
LOUIS	Laboratory Online Information System
MCCA	Motor Carrier Crash Analyst
MCCR	Motor Carrier Crash Report
MCMIS	Motor Carrier Management Information System
MCTD	Motor Carrier Transportation Division
NHS	National Highway System
NHTSA	National Highway Traffic Safety Administration
OASIS	Oregon Adjustable Safety Index System
OCR	Optical Character Recognition
ODOT	Oregon Department of Transportation
OLIVR	Oregon License Issuance and Vehicle Registration
ORS	Oregon Revised Statute
OSP	Oregon State Police
OTC	Oregon Transportation Commission
OTSDE	Oregon Transportation Safety Data Explorer
OVERS	Oregon Vital Events Registration System
PDO	Property Damage Only
PII	Personally Identifiable Information
PIO	Public Information Officer
PUCCIS	Public Utility Commission Crash Information System
QA/QC	Quality Assurance/Quality Control
RBIS	Records-Based Information Solution
SART	Serious Accident Review Team
SPIS	Safety Priority Index System
SSMS	SQL Server Management Studio
SSRS	SQL Server Reporting Services
SQL	Structured Query Language
STIP-SIP	Statewide Transportation Improvement Program – Safety Investment Program
TAIR	Traffic Accident and Insurance Report
TOL	Trucking Online (Motor Carrier Online Reporting Database)
VB6	Visual Basic 6
VMT	Vehicle Miles Travelled

1.3 Referenced Documents

- 2018 Motor Vehicle Traffic Crash Analysis and Code Manual, Transportation Data Section, Crash Analysis and Reporting Unit – Last updated September 2019. https://www.oregon.gov/odot/Data/documents/CDS_Code_Manual.pdf

- Electronic Crash Report Document Management Process, Transportation Data Section, Crash Analysis and Reporting Unit – Last updated October 2022.

1.4 Document Overview

This ConOps document is organized following the guidance in the *Institute of Electrical and Electronics Engineers (IEEE) 1362-1998 – IEEE Guide for Information Technology – System Definition – Concept of Operations (ConOps)* document. The remainder of this document is organized as follows:

- **Section 2 – Current System and Environment** describes the existing systems and processes from the standpoint of project partners.
- **Section 3 – Justification for and Nature of Changes** describes the shortcomings of the current system and processes from the standpoint of project partners. It also provides the user needs – or desired capabilities – for the proposed system.
- **Section 4 – Concepts for the Proposed System** describes the proposed system functionality required to meet the user needs identified in Section 4. This section also describes key features, the users, and their interaction with the system.
- **Section 5 – Operational Scenarios and Use Cases** documents the user-oriented use cases for how the proposed system may operate.
- **Section 6 – Summary of Impacts** describes the operational and organizational impacts of the proposed system on the various user groups, as well as impacts during development.

1.5 System Overview

To achieve the CDS Replacement and Process Improvement Project objectives, the project seeks to not only replace the CDS entirely with a user-friendly, modern system but also enhance other existing systems to provide a higher level of automation in crash report collection, crash data coding, QA/QC, and distribution and reporting in order to address the identified needs of users and gaps within the current systems and processes. The main components of the proposed system include:

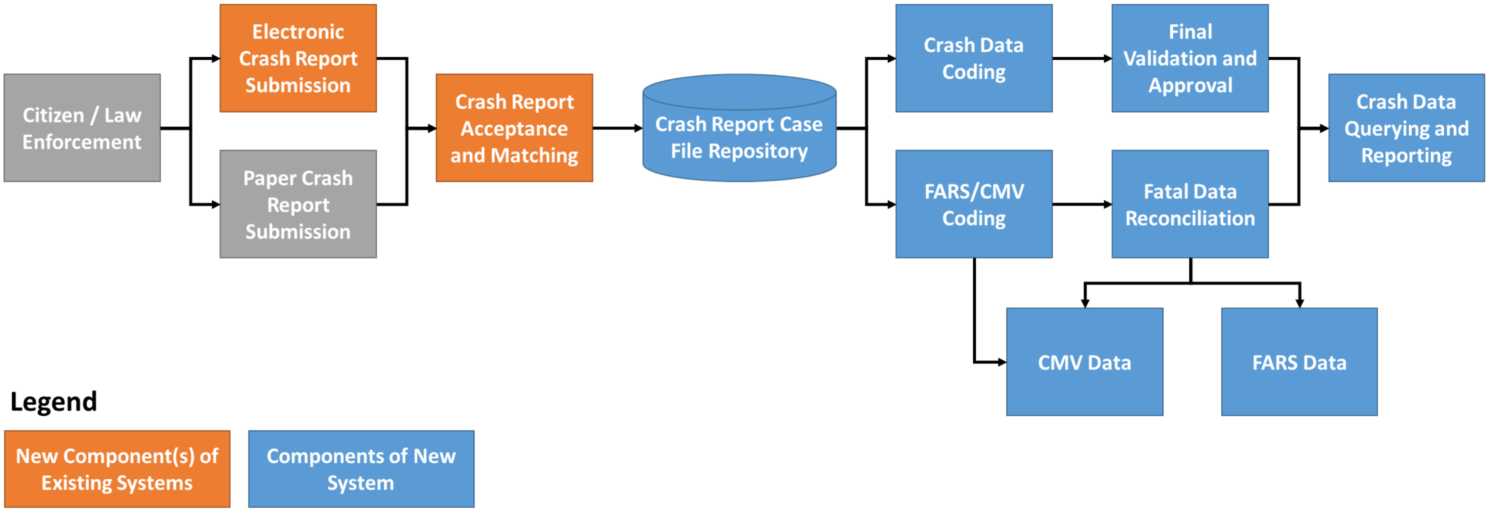
- **Electronic crash report submission methods.** These components allow both citizens and drivers to submit crash reports electronically, setting the stage for further automation.
- **Automated crash report acceptance and matching.** These components allow electronic crash reports to be automatically determined to be reportable, or non-reportable, and matched. The matching component would include an interface to allow manual matching for paper reports.
- **A single source for all data related to a crash.** The Crash Report Case File Repository would allow a single source connecting all data related to a crash event, eliminating the current practice of multiple crash report case files for the same crash event created in various disparate systems.
- **Improved crash data entry interfaces.** The new system replacing the CDS will include modern, responsive interfaces for crash data entry.
- **Automated crash data validation, reconciliation, and approval.** The new system replacing the CDS will include robust data validation at various stages of coding, including automated final validation and approval. This allows the data to undergo QA/QC procedures on a more regular basis, improving the timeliness of release of crash data for distribution and reporting. In addition, automated fatal crash data reconciliation will allow differences between fatal data coded by CDTs, the FARS Analyst, and the MCCA (for fatal CMV crashes) to be identified quickly to expedite the release of the most accurate fatal crash data.
- **Improved crash data querying and reporting tools.** An improved query management component, available internally and externally, will allow users to easily query the crash data to get the exact dataset they need and see their query results in a variety of formats, including on an interactive map. An

improved report management component will allow CDAs and the CDRT to easily create and maintain report templates and manage report automation to fulfill data requests and produce key data products in a timelier manner.

- **Interoperability with federal reporting systems.** FARS and CMV crash data export components will allow greater interoperability with the respective federal reporting systems.

The figure below shows a high-level context diagram for the proposed system and demonstrates how crash data may flow through the new components to existing systems and new system replacing the CDS.

Figure 1-1 Proposed System High-Level Context Diagram



2 Current System and Environment

2.1 Data Collection

2.1.1 Crash Report Collection

The Oregon Department of Transportation (ODOT) Driver and Motor Vehicle Services (DMV) receives paper crash reports from the public and law enforcement daily. Drivers are required to submit an Oregon Traffic Accident and Insurance Report to DMV within 72 hours of a crash if the crash resulted in injury, towing, or an amount of damage to a vehicle or other property over $2,500, per Oregon Revised Statute (ORS) 811.720. See Appendix A – Redacted Driver and Police Crash Reports for an example report. An accident report may be filled in by hand or electronically. There is currently no option for submitting a report with an electronic signature (though a pilot project for this is currently underway with an expected launch in August 2023), so the report must be printed, signed and either mailed to DMV or scanned and emailed. Approximately 48% of reportable crashes are self-reported by drivers, with the remainder being reported by law enforcement agencies. While drivers are required to report a qualifying crash within this time period, it may take up to 72 hours to several weeks from the time of the crash to be reported and received by DMV.

Law enforcement agencies are required to submit an Oregon Police Traffic Crash Report to DMV via mail or email. See Appendix A – Redacted Driver and Police Crash Reports for an example report. An agency may also record the crash in their agency's data entry system, though this is not a substitute for sending a report to DMV. Many departments across the state, though not all, use the Oregon State Police (OSP) Law Enforcement Data System (LEDS). Law enforcement agencies are required to report any crash they investigate to DMV per ORS 810.460.

The mailed reports are received through the DMV mail room where they are opened and delivered to the DMV Crash Reporting Unit (CRU) for sorting and processing. There are approximately 90,000 paper crash reports received by the CRU annually for processing, including approximately 500 fatal and 1,500 Commercial Motor Vehicle (CMV) crash reports.

Within the CRU, Crash Report Processors sort the crash reports, make copies of all fatal and CMV reports and send them to the File Management Clerk for imaging and placement into the CAR Unit secure incoming folder. As of November 2022, these reports include those involving small CMVs, which requires a Processor to review several fields on the form in order to correctly identify the crash. This process change was implemented in response to the U.S. DOT's Federal Motor Carrier Safety Administration (FMCSA) anticipated lowering the federal requirement to submit CMV crash data from 90 days after the crash occurred to 45 days by the end of 2022. For more information on this identification process, see 2.1.4 Motor Carrier Crash Data Collection. See 2.1.1.3 Crash Report Imaging for more information on the imaging sub-process. The Crash Report Processors then send all fatal crash reports to the Fatal Crash Clerk for specialized processing. See 2.1.1.1 Fatal Crash Report Processing for more information. All other reports are processed by the Crash Report Processors. See 2.1.1.2 Standard Crash Report Processing for more information. Overall, it can take within 3 months to 1 year from the time of the crash for a crash case file to be submitted to the CAR Unit.

The CAR Unit File Management Technician then retrieves the image files from the CAR Unit secure incoming folder, sorts by injury severity and renames the files if necessary, according to the required naming conventions used by the CAR Unit Crash Data Technicians (CDTs) – details of which are available in the Electronic Crash Report Document Management Process document. The File Management Technician then places the files into the CAR Unit FileNet upload staging folder in preparation for a scheduled automatic transfer to the CAR Unit FileNet, which notifies the File Management Technician of any errors via a daily email.

The files can then be retrieved from the CAR Unit FileNet by the CDTs, the Fatal Crash Technician, the Fatality Analysis Reporting System (FARS) Analyst and the Motor Carrier Crash Analyst (MCCA) for data input into their respective systems. See 2.2 Data Input for more detail.

The paper crash reports are kept in the DMV CRU file cabinets for three years, after which they are moved to cold storage and retained for a total of five or ten years, depending on the type of crash. After this time period the reports are destroyed. This sub-process is outside of the scope of this Concept of Operations.

2.1.1.1 Fatal Crash Report Processing

Fatal crash reports are run through specialized report processing. If the report received contains a fatality or suspected fatality, the DMV CRU Fatal Crash Clerk generates an Accident File Number manually using the Fatal Log Excel Spreadsheet and verifies the appropriate copies have been made and sent to the CRU File Management Clerk for imaging. If not, the Fatal Crash Clerk creates a copy and places the Accident File Number on both the copy and the original report from law enforcement. The copies are then sent directly to the File Management Clerk for imaging.

The Clerk then checks the Fatal Book for related personal reports and teletypes, reviews the report to determine if the crash event was avoidable, caused by a medical condition or requires review by the Serious Accident Review Team (SART) and enters all relevant information into the Oregon License Issuance and Vehicle Registration (OLIVR) and the Fatal Log. The Clerk then determines if the driver submitted a crash report. If not, the Clerk indicates as such and OLIVR adds a Failed to Report Verdict, Sanction and Requirements for the driver. The Clerk then determines if insurance information was provided in the report. If not, the Clerk indicates as such and OLIVR adds an Uninsured Accident Verdict, Sanction and Requirements for the driver. The report is then sent to SART for their review process if required and is filed by the Accident File number and sent to the File Management Clerk for imaging.

If insurance information was provided in the report, the Clerk determines if an Insurance Verification Form is needed. If so, the Clerk indicates as such and OLIVR generates and mails an Insurance Verification Form letter to the insurance provider. The Clerk then files the report by the Accident File number. If a response is received and the insurance could not be verified, the Clerk indicates as such and OLIVR adds an Uninsured Accident Verdict, Sanction and Requirements for the driver. The report is then sent to SART for their review if required and is filed by the Accident File Number and sent to the DMV CRU Scanning Team for imaging.

2.1.1.2 Standard Crash Report Processing

Crash reports that do not include fatalities are ran through standard crash report processing. The DMV CRU Crash Report Processor files the reports by county and date in an Unmatched File Cabinet. If the accident date has already been processed, the report is filed with the next date to be processed. The reports remain in this waiting area for approximately 2-8 weeks depending on unit workload, or what is referred to as the "service window." During this time, related reports (multiple reports received from participants or law enforcement for the same crash event) are able to be matched together forming a crash report case file.

From there, the Processor determines the next county/date group of reports to be processed, checks out and pulls the report batch from the Unmatched File Cabinet and alphabetizes them by the last name of the primary driver listed. The Processor then performs a lookup of insurance records for the reporting driver using OLIVR and ensures the make and model of the vehicle, insurance company, and insurance policy number matches the data provided in the report. The Processor also checks that the effective date on the insurance policy covers the date of the accident.

If the insurance is verified, the Processor gathers additional information from the Insurance tab in OLIVR and indicates this information on the report. If the insurance is not verified, the Processor indicates as such and

OLIVR generates and mails an Insurance Verification Form letter to the insurance provider. The Processor then reviews the Unmatched File Cabinet to match any additional related crash reports and creates a cover sheet for filing, enters the crash report on each Driver Record in OLIVR, and assigns an Accident File number (referred to as the Serial Number in the CAR Unit). If a report has not been submitted by the driver, the Processor indicates as such and OLIVR adds a Failed to Report Verdict, Sanction and Requirements for the driver. If insurance information is not provided, the Processor indicates as such and OLIVR adds an Uninsured Accident Verdict, Sanction and Requirements for the driver. The report is then filed by the Accident File number and sent to the CRU File Management Clerk for imaging.

2.1.1.3 Crash Report Imaging

Fatal, CMV and standard crash reports are sent to the DMV CRU File Management Clerk for imaging at different times throughout the various process steps. Each report is scanned and saved as a PDF containing multiple pages. When a report is received after CRU standard processing, the Clerk names the file according to the required naming conventions used by the CAR Unit Crash Data Technicians. Fatal crash report files are not named according to this convention, and CMV crash report files are only named this way when received after standard processing. The image file is then placed in the CAR Unit secure incoming folder for the CAR Unit File Management Technician to retrieve.

2.1.1.4 Key Challenges

Through a review of the crash report collection process, as well as interviews with unit staff, the following key challenges have been identified.

- Timeliness of the data. From the date the crash occurred, it can take up to 72 hours to several weeks for the crash to be reported to DMV by a driver, and up to 10 days to several months to be reported by police. From there, it can take between 2-4 weeks for a crash not involving a fatality or a CMV to be processed depending on CRU workload. Overall, it can take 3-6 months from the time the DMV receives a crash report to the time the imaged reports are made available to the CAR Unit.
- Difficulties in the driver reporting process. As there is not an option to electronically sign the form a driver is required to submit, the driver must have access to a printer and scanner or be able to physically mail the form to the DMV. Drivers have also expressed that the form fields are confusing and difficult to fill out. There is however a pilot project the DMV is currently undertaking to establish an electronic signing option for these forms, with results expected in 2023.
- Clarity and quality of data in submitted reports. As the form the driver is required to submit is available in both hand- and electronically fillable formats, there may be difficulty in interpreting the data in the report. Further, drivers have expressed that the form fields are confusing and difficult for them to fill out, which can result in fields missing data.
- Missing, incomplete, or inconsistent law enforcement accident reports. Different law enforcement agencies may have different policies and training in regard to filling out accident reports, which can result in incomplete and inconsistent data.

2.1.2 State File Fatal Crash Data Collection

Each morning the CAR Unit Fatal Data Technician (FDT) searches various media outlets, law enforcement data systems and ODOT databases for initial crash data and puts all documents relating to a specific crash into a case file folder. Sources include:

- Scanned images of hardcopy police reports from DMV,
- LEDS for initial information from law enforcement,
- Media Flash Alerts for information on fatal crashes not yet in LEDS,

- ODOT InView system for information added by the ODOT Intelligent Transportation Systems' Traffic Operations Center state highway dispatch, and
- ODOT Crash Locator Tool (CLT), used to verify location data.

If a crash discovered during this information gathering process does not have an official law enforcement teletype or police report, the FDT creates an unofficial teletype using the data collected and contacts the applicable law enforcement agency to request a police report. The FDT also places this unofficial teletype into the FARS data folders for processing by the FARS Analyst. The DMV CRU no longer accepts these unofficial teletypes as initial crash reports.

The FDT then enters the sources of information about each crash in the Microsoft Excel Fatal Tracking Log by the month the crash occurred and assigns a fatal number. The format used for the fatal number is (YY)MM-XX (e.g., the first fatal crash of March 2022 would be given a fatal number of (22)03-01). The FDT then enters the initial data into the Fatality Tracker Access database (described in more detail in 2.2.2 State File Fatal Crash Data Input), and produces and distributes the Initial Fatal Information List (described in more detail in 2.4.2 State File Fatal Crash Data Reports and Requests).

Over the next few days, the FDT will search for or receive additional details about the crash or learn of a crash not previously reported. Data sources the FDT uses for this include:

- Death certificates from the FARS Analyst, which are retrieved after the FARS Analyst receives a list of available death certificates quarterly from the OSP Medical Examiner's Office, and
- Blood Alcohol Content (BAC) and toxicology reports, which are received from OSP and other private forensic labs or retrieved from the Laboratory Online Information System (LOIS).

If the information found or received is about a previously unreported crash, the FDT creates an unofficial teletype for the crash and proceeds with the steps previously described. If the information is about a previously reported crash, the FDT updates the data in the Fatality Tracker and the files it in the corresponding case file folder. The FDT then scans and saves the documents in the FARS folders and notifies the CDT Team Lead, the FARS Analyst, and the MCCA that new fatal crash data is ready to be entered into their respective systems. See 2.2 Data Input for more information about these data entry processes.

2.1.2.1 Key Challenges

Through a review of the state file fatal crash tracking process, as well as interviews with unit staff, the following key challenges have been identified.

- Timeliness of the data. There are often delays in the FDT receiving police reports from the DMV CRU or getting notifications of a fatal crash from other sources, such as death certificates as the CAR Unit staff are only notified by the OSP Medical Examiner's Office of newly available death certificates quarterly. This results in delays in fatal data tracking.
- Missing or late police reports. The DMV used to receive unofficial teletypes from the FDT as initial indication of a fatal crash and use the data provided to request an official police report from the investigating law enforcement agency, but these documents are no longer accepted as initial fatal crash reports. This can result in missing or late police reports being received by DMV and made available to the FDT.

2.1.3 FARS Data Collection

The CAR Unit FARS Analyst receives data about fatal crashes from a variety of sources. In most cases the first piece of information received about a traffic fatality are Fatality Teletypes, which the CAR Unit FDT receives daily from investigating law enforcement agencies and sends as copies to the Analyst. The Analyst enters the data from the teletype into the FARS Tracking System Access database and creates an electronic case file folder. The Analyst also uses data from the teletype to enter an Early Notification into the FARS Records-Based Information Solution (RBIS) system. For more information about entering data into the Tracking System or the Early Notification process, see 2.2.3 FARS Data Input.

The main source document for case information is crash reports submitted by law enforcement. Oregon law requires the investigating law enforcement agency to submit the report to the DMV CRU, copies of which are made available to the Analyst through the workflow described in 2.1.1 Crash Report Collection.

The Analyst continues crash report processing by retrieving or requesting additional data from other sources. For each driver and vehicle listed on the crash report, the Analyst looks up driver and vehicle records. Oregon driver and vehicle records are accessed through the DMV2U system. Driver and vehicle records for out-of-state drivers are obtained by using the computer message system within RBIS to send requests to the appropriate state's FARS office. Canadian records are obtained by mailing a cover letter explaining the reason for the request, a Canadian request form with the information needed highlighted, a FARS brochure and a self-addressed envelope. Vehicle registration information for medium/heavy trucks are obtained by contacting the CAR Unit MCCA. The records, once accessed or received, are added to the correct FARS case file folder.

The Analyst also enters Emergency Medical Services (EMS) information from the crash report into the Microsoft (MS) Excel EMS Log for various victim types, including the most seriously injured victim who was transported to the hospital, occupants who were ejected from the vehicle, occupants for whom restraint use is unknown and in the case of the crash report lacking entries in the "Time EMS Notified" and/or "Time EMS Arrived" fields. After entering this information and indicating high-level EMS information on the case file and folder, the Analyst creates request letters by merging the EMS Log with a MS Word form letter and mails the letters to the EMS provider agency. Once responses have been received from the appropriate EMS provider agencies, the corresponding records are removed from the EMS Log and the letters are filed in the case file folder.

The Analyst uses the CLT to code various pieces of data into the FARS Coding Forms, including National Highway System (NHS), Roadway Functional Classification, Route Signing, Trafficway ID, milepoint, and any other additional location information.

Once the above steps have been taken, the case is ready to be entered into RBIS. See 2.2.3 FARS Data Input for more information.

The Analyst may still receive additional information about a fatal crash event, which is processed and filed as it arrives. The Analyst receives copies of BAC and toxicology reports for traffic fatalities from the CAR Unit FDT which are obtained from the OSP Medical Examiner's Office. The Analyst uses LOIS to search for surviving driver BAC and toxicology reports. If nothing is found, the Analyst sends a request to the state forensic crime lab for further help obtaining the reports.

The Analyst routinely receives copies of Motor Carrier Crash Reports and vehicle registration screenshots from the CAR Unit Motor Carrier Crash Analyst on fatal crashes involving medium or heavy commercial trucks.

Quarterly, the Analyst receives a spreadsheet containing a list of all persons who died in traffic related crashes from the State Health Division Center for Health Statistics. The Analyst logs in to the Oregon Health Authority Oregon Vital Events Registration System (OVERS) to retrieve the death certificates, and then files them in the corresponding case file folders and indicates the certificate has been retrieved for the record in the Tracking System. If a name from the spreadsheet is not found in the Tracking System, the Analyst retrieves the corresponding death certificate from OVERS to verify if it was a non-traffic crash. If so, the Analyst sends a copy of the death certificate to the CAR Unit FDT to create a teletype.

In addition, monthly, the Analyst will check for case files missing crash reports on cases that are more than two months old using a report generated from the Tracking System. For case file folders with teletypes but no crash reports, the Analyst first checks if FDT has received a copy of the crash report. If so, the Analyst receives a copy and proceeds with processing. If the CRU has still not received the crash report, they request a copy from the investigating agency. If a deadline is imminent, the Analyst informs the FDT and the CRU that they will contact the investigating agency directly to request that the crash report is mailed or faxed to the Analyst. Once the crash report is received, copies are sent to the FDT, and the CRU and the Analyst can proceed with processing.

2.1.3.1 Key Challenges

Through a review of the FARS data collection process, as well as interviews with unit staff, the following key challenges have been identified.

- Timeliness of the data. At times there are delays in the police investigating agency sending teletypes or PARs to the appropriate recipients, which results in a delay in the FARS Analyst receiving copies. The Analyst is required to submit FARS data to meet certain federal benchmarks, and these delays require extra, occasionally time-intensive processes on the part of the Analyst to request copies from various parties. In addition, there are often delays in the Analyst receiving various lab reports, which also negatively affects the ability to meet benchmarks.

2.1.4 Motor Carrier Crash Data Collection

The CAR Unit MCCA receives notification of a motor carrier crash through a variety of sources, including:

- Scanned images of hardcopy police reports from the DMV or occasionally directly from law enforcement
- Motor Carrier Crash Report (MCCR) forms from the DMV or Carriers via fax, mail, email and the Trucking Online (TOL) Motor Carrier Online Reporting Database
- DMV Traffic Accident and Insurance Report (TAIR) forms from the DMV or Carriers
- Police Truck/Bus Supplemental Forms directly from law enforcement or the DMV via fax
- LEDS teletypes from the CAR Unit FDT
- OSP NICHE alerts from the FARS Analyst or the FDT
- News articles for additional information as needed from the FDT
- ODOT InView system daily crash reports
- Flash Alerts

Prior to November 2022, the MCCA was tasked with reviewing all crash reports received from DMV to identify crashes involving small CMVs as previously they were not initially recognized as a CMV crash by DMV – details of this process are available in the Electronic Crash Report Document Management Process document. As of November 2022, this identification process is handled by a temporary resource in the DMV CRU. A secondary resource within the CAR Unit has also been temporarily and partially reassigned to assist the MCCA in getting caught up with coding recent reports. Further process changes to address this gap in the future, including hiring an additional limited duration or permanent MCCA, are currently being discussed.

The MCCA prepares a case file for each crash, indicates the date received and highlights items of pertinence such as death, injury requiring transport from the scene to seek medical attention, or anything else indicating a vehicle being towed, or a participant being moved, from the scene. The presence of any of these items will determine if the crash is federally reportable.

If a crash is federally reportable, the MCCA determines if the crash had already been entered into the SAFETYNET system. If so, the MCCA updates the existing record and adds the additional forms into the case file. If not, the Analyst compares the crash to existing pending case files to determine if the crash is related to previously submitted documentation that had been incomplete or had missing federal reportability criteria indicators.

The MCCA then retrieves and prints driver and vehicle records using the DMV2U system and the Carrier and Large CMV pages from the Public Utility Commission Crash Information System (PUCCIS) Mainframe and places the documents in the case file folder. The MCCA then enters the crash data into the SAFETYNET system or updates the record if already entered. See 2.2.4 Motor Carrier Crash Data Input for more information.

Weekly, the MCCA reviews pending case files to ensure crashes that have not been matched to a pending case file have not been entered into the SAFETYNET system. After 90 days, pending cases are transferred to the "Hold File" in case any additional information is received at a later date. Both the pending cases and the "Hold File" are stored in a locked drawer.

Historically, the MCCA had 90 days to enter data into the SAFETYNET system in order to be in compliance with federal law. If no MCCR had been received within 30 days after the crash, the MCCA mailed a courtesy letter/request for compliance to the Carrier. If no response was received in 30-45 days, the case file was sent to the Motor Carrier Transportation Division (MCTD) for enforcement. However, at the end of 2022 the U.S. DOT's FMCSA lowered the reporting requirement from 90 days to 45 days and as a result, this timeline has been adjusted accordingly.

2.1.4.1 Key Challenges

Through a review of the motor carrier crash data collection process, as well as interviews with unit staff, the following key challenges have been identified.

- Changes in federal reporting requirements. The U.S. DOT's FMCSA lowered the reporting requirement from 90 days to 45 days at the end of 2022. In addition to a substantial increase in CMV crashes (a 53% increase from 2011 to 2021), this has resulted in various short-term work process changes to meet the new reporting requirement, with long-term changes still in discussion.
- Backlog of coding work. The previous process step requiring the MCCA to review all of the crash reports to identify those involving a small CMV has resulted in a backlog in coding work that may result in a failure to meet anticipated federal reporting requirements. As a result, a temporary resource has been partially re-assigned to assist the MCCA in getting caught up.

2.2 Data Input

2.2.1 Crash Data System

Daily, the CAR Unit Crash Data Technicians (CDTs) retrieve scanned images of hardcopy crash reports from the CAR Unit FileNet and enter the data into the Crash Data System (CDS). The CDS serves as a data entry, validation, reporting, and database repository for information derived from the crash reports for the state file. At the time of entry, the data is considered preliminary until the annual quality assurance/quality control (QA/QC) procedures are completed, after which the data is considered final for that crash year. For more information on final QA/QC procedures, see 2.3 Quality Assurance/Quality Control Procedures.

2.2.1.1 Data Entry Process

CAR Unit CDTs enter data from the imaged crash reports in order of injury severity – fatal crashes are coded first, then serious injury crashes, and non-injury (commonly referred to as Property Damage Only, or PDO) crashes are coded last with a reduced number of data elements. Approximately 135 unique data fields, including system-generated fields, are entered into the CDS for each crash event. Each crash record is divided into three main components:

- Crash Level – This component includes data fields that pertain to the crash event, including location (and all supplemental roadway information), time, crash type and weather. Some fields within this component are filled in by the system based on values from CDT-entered fields.
- Vehicle Level – This component includes data fields that pertain to each vehicle involved in the crash, including vehicle type, movement, and direction of travel. Most of these fields are not used for PDO crashes.
- Participant Level – This component includes data fields that pertain to each participant in the crash (drivers and passengers in motor vehicles, pedestrians, and bicyclists), including age, gender, impairment, and error or contributing factors (e.g., distraction, speeding, failure to yield, etc.). Most of these fields are not used for PDO crashes.

See the 2018 Motor Vehicle Traffic Crash Analysis and Code Manual for details on fields in each of the above components.

In addition, the CDT is able to pinpoint the location of a crash using the CLT and import data for various fields into the crash data entry/maintenance screen. See 2.2.1.2 Locating a Crash for more information.

From the data entry/maintenance screen, a CDT may also retrieve previously entered crash records and update them if the record has not been finalized or transferred to the reportable database (though CDTs with an administrator role within the CDS may update these records).

Various validation rules are run by the system when the CDT attempts to validate and save a crash record. For details on system-automated data validation, see 2.2.1.3 Data Validation.

Once the record has passed all validation checks, the record is assigned a preliminary crash ID and stored on the CDT's local database. Once or twice a week, or up to daily depending on the time of year, the CDT Team Lead will run a batch approval process which pulls all preliminary crashes from the CDTs' local machines. Once all crashes have been approved, the CDT Team Lead then transfers them to the reportable data tables within the main CDS database. See 2.2.1.4.1 Batch Functions for more information on the approval and transfer processes.

QA/QC procedures are done at various times throughout the year, and a final round of QA/QC is done once all crashes for a calendar year have been entered, approved, and transferred. See 2.3 Quality Assurance/Quality Control Procedures for more information.

Once this process is done, the crash database for that year is finalized and can be used for reporting, although some reporting can be done on preliminary data as well. See 2.4 Data Reports, Requests, and Reporting Tools for more information.

2.2.1.2 Locating a Crash

A CDT is able to pinpoint a crash location by clicking the "Crash Locator" button on the data entry/maintenance screen. This launches the CLT in a Microsoft Edge browser. From the CLT main screen, the CDT can locate a crash in a variety of ways, including:

- Using various search tools to locate intersections, streets, cities, counties, and even exact street addresses or landmarks,
- Identifying streets by clicking directly on the road segment, and
- Navigating to specific areas such as a point of latitude/longitude, highway milepoint, LRS milepoint, bridge, city, county, and more.

After navigating to the crash location, the CDT zooms all the way in and harvests the underlying location data by dropping a pin on the crash location, selecting Crash Data Entry from the Crash drop-down menu, and clicking the dropped pin. If the pin is on an intersection, the CLT will prompt the CDT to choose which street or road segment for which data should be imported from a list of road segments located on that intersection.

If the crash report contains no location details except for a general area such as a city or county, the CDT is able to use the CLT to place an un-locatable crash. The CLT prompts the CDT for the city or county and then harvests data using a standard point for all un-locatable crashes within a given boundary.

Once the crash has been located and the data has been harvested, the CDT clicks the "Import/Close" button to import data from the CLT into the crash data entry/maintenance screen. The imported data fields include ODOT region, ODOT district, city, county, urban area, milepoint, and several others.

The CDT may instead click the "Cancel/Close" button to close the CLT without importing any data.

If new location data is received after the preliminary crash record has been entered, the CDT may edit the record and use the CLT to re-locate the crash and import the new location data, overriding previously entered data.

2.2.1.3 Data Validation

There are almost 250 validation rules that the system checks for various data elements when an attempt is made to validate and save the data. Error messages appear on the data entry screen when a rule is violated, and the affected field is highlighted in red for severe errors or yellow for warnings. Severe errors must be resolved before the crash can be saved to the database and cannot be overridden. Warning errors prompt the CDT to review the affected field(s) before saving the record but can be overridden.

For the error messages, standard messages are frequently used with substitutions made as needed to display the applicable programmed screen field names (in the case of missing data), database table and column names (in the case of database lookups that do not find a match), and specific field values.

2.2.1.4 Other CDS Functions

The CDS also has functions other than data entry and maintenance. These include batch functions such as producing daily entry logs, maintaining street and intersection set-ups, as well as maintaining various aspects of the application. The availability of each use case is limited to the role of the user in the system. The three roles and their available functions within the system are:

- Coders may enter crash data, view and edit preliminary crash records, view reportable crash records (and edit if the user was the one to originally enter the record), produce entry logs, view existing streets and intersections, as well as other miscellaneous functions.
- Decoders may perform all functions available to Coders, as well as perform all street/intersection maintenance and reporting functions.
- Administrators may perform all functions available to Decoders, as well as view and edit all reportable crash records, perform all batch and system management functions, manage the report format and query libraries, and evaluate report format and query usage.

Batch Functions

There are various batch functions within the CDS, most of which are only available to those with the Administrator application role. These functions include:

- Produce Entry Log – Available to all application roles, this allows the user to run a report to produce a log of the crashes entered for that CDT for tracking purposes.
- Approve Crashes – Available to Administrators, this allows the user to approve all preliminary crashes to ready them for transfer. The CDS pulls preliminary crash records from the CDTs' local machines, and if

any of the records have errors, a Crash Validation Error Report will be generated and displayed and can be printed out as needed. After closing this report, the CDT can review errors for each record and either accept the warnings or update the data. In addition, the CDT can bypass the record or choose to finish later. Bypassing will skip the current record and go one to the next one. Finishing later will end the process. Upon finishing this process, the records are saved to temporary storage on the main CDS database in tables with a PREL prefix.

- Transfer Crashes – Available to Administrators, this allows the user to transfer the approved crashes from preliminary status to reportable by saving them to the corresponding tables in the main CDS database that do not have a PREL prefix. The corresponding records are then removed from the tables with a PREL prefix.
- Compute Rate Book Values – Available to Administrators, this allows the user to select a category between statewide, OSP, and Speed (SPD) 70, and enter start and end years for which to compute values that are used in the Crash Rate Book. Any previously computed values for the selected years are overwritten.
- Compute STIP-SIP Values – Available to Administrators, this allows the user to enter a year for which to compute values that are used to produce the Statewide Transportation Improvement Program – Safety Investment Program (STIP-SIP) mapping extract. This function is no longer in use and will not be needed in the future.
- Compute VMT Summary Values – Available to Administrators, this allows the user to select a category between statewide and OSP, and enter start and end years for which to compute values that are used to produce the Rate Book Vehicle Miles Travelled (VMT) Tables II through V. This process extracts the required data from the applicable detail tables, summarizes the information to the necessary level, and stores the resulting values in a summary table. Five years-worth of summaries are computed and stored. The summary table can then be used with crash rate files and the existing reporting process to produce the actual VMT reports. Any previously computed values for the selected years are overwritten.

Reporting Functions

There are various reporting functions within the Reporting Application portion of the CDS which are available to the Decoder and Administrator roles. These functions allow a user to fulfill data requests through a collection of pre-defined queries and reports, with the ability to create more queries and reports as necessary. These functions include:

- Build a New Query – Available to Decoders and Administrators, this allows a user to build a new query if none of the available queries meet the data selection requirements. Basic familiarity on how to specify data requirements in a Structured Query Language (SQL) format is required. This query can be saved for future use.
- Modify a Query – Available to Decoders and Administrators, this allows a user to modify an existing query to fit specific selection criteria. Basic familiarity on how to specify data requirements in a SQL format is required. This query can be saved to overwrite the existing query, or as a new query by providing a new name.
- Delete a Query – Available to Decoders and Administrators, this allows a user to delete a query that no longer serves business needs, though any report run statistics that involve the use of this query will also be deleted as a result. Care must be taken so that any shared queries or queries that the CDT did not create themselves are not deleted.
- Generate Reports/Extracts – Available to Decoders and Administrators, this allows a user to generate a report from a list of available report templates using the query specified.

A user is able to perform ad-hoc reporting directly against the CDS database. This includes the use of any tool aside from the CDS Reporting Application. These situations are rare as the CDS Reporting Application functions are flexible enough to meet most reporting needs.

In addition, users with the Administrator role may also perform functions to manage the report format library, as well as evaluate report format and query usage. These functions include:

- Create a New Report Format – Available to Administrators, this allows a user to create and save a new report format for future use. This function is performed using the Crystal Reports software, which is launched through the CDS.
- Modify an Existing Report Format – Available to Administrators, this allows a user to modify an existing report format to fit specific criteria. This format can be saved to overwrite the existing format, or as a new format. This function is performed using the Crystal Reports software, which is launched through the CDS.
- Delete a Report Format – Available to Administrators, this allows a user to delete a report format the no longer serves business needs. This function is performed using the Crystal Reports software, which is launched through the CDS.
- Evaluate Report Format/Query Usage – Available to Administrators, this allows a user to determine how often various report formats and queries are used by generating a report that contains the number of times each report format was run in combination with a given query in each month between the specified start and end dates.

Street Maintenance Functions

There are various street maintenance functions within the CDS, some of which are available to users of all three roles, and some are only available to the Administrator role. These functions include:

- View Existing Streets – Available to all roles, this allows the user to view a list of all street records within a county or city, or a specific record by street type, number and name.
- Add/Modify Streets – Available to Administrators, this allows the user to add a new or modify existing street records. Once a record is entered and validated, it cannot be deleted from the system. CDTs can discard an entry before it has been saved by clicking "Discard Changes."
- View Street History – Available to all roles, this allows the user to view all changes that have been made to a street record.
- View All Intersections for a Street – Available to all roles, this allows the user to view all intersection records that are in an intersection relationship with the selected street record.
- View Selected Intersection Details – Available to all roles, this allows the user to view all street records that participate in the selected intersection.
- Add/Modify Intersection – Available to Administrators, this allows the user to add new or modify existing intersection records. Once a record is entered and validated, it cannot be deleted from the system. CDTs can discard an entry before it has been saved by clicking "Discard Changes."
- Add Street to Intersection – Available to Administrators, this allows the user to create an intersection relationship between an intersection record and a street record. If the street record is new, it must be added prior to associating it with an intersection record.
- Delete Street from Intersection – Available to Administrators, this allows the user to remove the intersection relationship between the street record and the intersection record before the intersection record has been saved.
- Terminate Street from Intersection – Available to Administrators, this allows the user to enter a termination date for the street record's participation in the intersection. The street will continue to

show on the intersection for historical purposes, but the termination date shows that it is no longer an active part of the intersection.

System Management Functions

There are various system management functions within the CDS that are available to individuals with the Decoder or Administrator roles. These functions include:

- Build Cause-Err-Evnt Report Values – Available to Decoders and Administrators, this allows the user to have the system distribute the updated description value(s) from the lookup table(s) to the denormalized data table(s). To simplify the reporting process by minimizing the number of "joins" required to simply retrieve code descriptions, most of the "short" descriptions for the various codes are "denormalized" into the data tables (Crash, Vehicle, Participant, etc.). As a result, when a denormalized description for an existing code value is modified in the lookup table, that modified description must also be updated in all data records that utilize that code value.
- Maintain Reference Tables – Available to Administrators, this allows the user to add new or modify existing code records for a selected table.
- Distribute Description Changes – Available to Administrators, this allows the user to modify all Crash, Vehicle, and Participant table records that contain a short description for one of the codes that have been modified to contain the new short description value.
- Compute 3-Year Avg. Stats Values – Available to Administrators, this allows the user to enter a year for which to compute the average number of crashes expected for each county and month, based on the prior three years' history.
- Import Annual Road Segment Values – Available to Administrators, this allows the user to enter a year for which to import data into the Highway Segment History table. This information is used to validate data entered throughout the coding year.
- Import Annual Route Segment Values – Available to Administrators, this allows the user to import the most recent information to the Route Segment History file. This information, combined with the Route lookup table, is used throughout the coding year to determine which Interstate, US or Oregon Route (if any) was the location of a crash.
- Import Streets – Available to Administrators, this allows the user to import street data for certain jurisdictions from an outside data source. This exact function is no longer in use and will not be needed in the future.
- Purge Report/Query Usage Statistics – Available to Administrators, this allows the user to purge records from the report format/query statistics table older than a given date.
- Compute Crash Statistics – Available to Administrators, this allows the user to establish a baseline of the number of crashes for each county in each month that are anticipated to be received by the CAR Unit during the coming coding year. These baseline values are computed from the average of the number of crashes that occurred in each county in each month in the preceding three years.

Miscellaneous Functions

There are various miscellaneous functions within the CDS that are available to users of all three roles, including:

- Print Crash – This allows the user to print a crash record or export it to a variety of formats, including PDF, Crystal Reports, HTML, Microsoft Excel, Microsoft Word, CSV, etc.
- Delete Crash – This allows the user to delete the crash record from the database if it had been previously entered or clear all fields on the Crash Data Entry/Maintenance screen.

2.2.1.5 System Specifications

The CDS includes two primary components – a crash data entry tool and the CLT. The CDS was originally implemented in 2003 with its most recent enhancement in 2019 with the integration of the CLT. The CDS was built by a contractor using Visual Basic 6 (VB6), which reached its end-of-life in 2008 and is no longer supported by Microsoft. The CDS is supported by Geographic Information Services (GIS) web developers within ODOT's Enterprise Application Services (EAS). The CDS connects to a SQL Server 2017 database where all crash data is housed, and includes various stored procedures, triggers, and constraints.

The CLT is a web application created primarily using JavaScript, the ArcGIS Application Programming Interface (API) for JavaScript (version 3.x), and the Dojo Toolkit for JavaScript. The tool was originally implemented in 2009 as an ArcIMS application, with major enhancements to use a more modern ArcGIS API in 2012-13. An enhancement for the tool with increased search capabilities and utilization of React framework and version 4.x of the ArcGIS API for JavaScript is currently undergoing testing with an expected release in mid-2023. It was built and is supported by GIS web developers within EAS.

Security in the CDS is controlled using Active Directory groups which define various application roles. See 2.2.1.4 Other CDS Functions for details on the application roles.

The CDS also utilizes Crystal Reports (version 11.5 for Developers) for report format management.

In addition to the production CDS, there is also a version of the CDS used for testing and training purposes. The test CDS has all of the same system specifications as the production CDS. It also connects to a test SQL Server 2017 database where a sample years-worth of data is housed for training purposes.

2.2.1.6 Key Challenges

Through a review of the CDS and CLT and the data input process, as well as interviews with unit staff, the following key challenges have been identified.

- The system platform is no longer supported. The CDS was built using VB6, which reached its end-of-life in 2008 and is no longer supported by Microsoft. This makes any enhancements to the application, beyond basic maintenance tasks, difficult to impossible. The system is beyond its life expectancy. In addition, the CDS has a long backlog of requests for work that are not being addressed, both due to the nature of the system platform and staffing constraints. This results in a system that is not able to meet future business needs.
- Data entry is strictly manual. There is no way to import data from other systems, resulting in a time-intensive manual data entry process. This not only includes crash data, but also street and intersection data.
- The system is not geospatially enabled. Though enhancements have been made through the integration of the CLT, which allows coders to pinpoint a crash location and import select location data fields, the system itself is not geospatially enabled. This results in an extra time-intensive process to add and verify geospatial data.
- Two versions of the CDS must be maintained concurrently. The CAR Unit uses the test CDS for training new staff, and any maintenance performed on the production system must be duplicated on the test system.

2.2.2 State File Fatal Crash Data Input

After gathering initial data for a fatal crash from a variety of sources, the CAR Unit FDT enters this data into the Fatality Tracker Access Database. Approximately 40 unique data fields, including system-generated fields, are entered into the Fatality Tracker for each fatal crash event. The data entry screen is divided into three main components:

- Common Data – This component includes data fields that pertain to the fatal crash, including date and time, the reporting agency, and location details.
- Individual Data – This component includes data fields that pertain to each fatality, including name, age, gender, date of birth, date of death, participant type, vehicle category, and a number of flags providing additional details (e.g., ejected from vehicle, air bag deployed, etc.)
- Removed Fatals – This component includes data fields that pertain to an individual previously indicated as a fatality where it was later found that the individual died of other causes, including cause, explanation and date removed.

From the main Fatality Tracker data entry screen, the FDT may also retrieve and edit previously entered fatal crash records and perform various data queries. See 2.2.2.1 Fatality Tracker Data Queries for more information.

Once the FDT has entered and saved all records for the day, the FDT uses the data to create the ODOT Initial Fatal Information List. See 2.4.2 State File Fatal Crash Data Reports and Requests for more information.

After any additional data is received and the Fatality Tracker Access Database records are updated, the FDT scans and saves all relevant documents into the FARS folder structure and notifies the CDT Team Lead, the FARS Analyst, and the MCCA. The CDT Team Lead then proceeds to enter the fatal crash records into the CDS. See 2.2.1 Crash Data System for more information. The FARS Analyst and the Motor Carrier Crash Analyst also enter or update the fatal crash records into their respective systems. See 2.2.3 FARS Data Input and 2.2.4 Motor Carrier Crash Data Input for more information.

2.2.2.1 Fatality Tracker Data Queries

The FDT may query the data in the Fatality Tracker Access Database in a variety of ways, including:

- By Name – to find fatal crash records by the individual's name,
- By DMV Number – to find fatal crash records by the DMV-assigned serial number,
- By Date – to find fatal crash records by a given date, and
- By Crash Number – to find a fatal crash record by the FDT-assigned crash number.

There are a number of other queries within the database that support report generation. See 2.4.2 State File Fatal Crash Data Reports and Requests for more information.

2.2.2.2 System Specifications

The Fatality Tracker is a Microsoft Access Database that is located in an internal drive accessible only to the CAR Unit. The database was originally created in 1990 with a major overhaul in 2002, and with its most recent enhancement in 2018. The Fatality Tracker was created and is supported by ODOT Transportation Data Section staff.

The Fatality Tracker contains 5 internal tables which include three data tables and two lookup tables. In addition, the Fatality Tracker contains a number of legacy macros.

2.2.2.3 Key Challenges

Through a review of the Fatality Tracker Access Database and data input process, as well as interviews with unit staff, the following key challenges have been identified.

- Timeliness of data entry. Due to staffing constraints, there are occasional delays in entering known fatal crash records. Staff could benefit from identifying and enforcing benchmarks for data entry.
- Data security. Due to the format of the database and its location in an internal drive available to anyone with access to this drive and can be edited by anyone with the appropriate permission levels, the data

may not be as secure as data stored in the CDS SQL database. There is also a risk of inadvertently deleting data records, as there are no intuitive checks and balances within the database.

- Difficulty of database enhancements. Due to the presence of a number of legacy macros and a general lack of staff expertise, performing any enhancements to the database, aside from simple query updates, is difficult without more intensive training opportunities.

2.2.3 FARS Data Input

The Oregon FARS Tracking System used by the FARS Analyst is the main tool for organizing and managing the FARS caseload. The Tracking System is an Access database that contains records for each fatal crash, each fatality, and each driver involved in the crash. It also contains data reports, search functions, and quick query options that allow the analyst to provide data from the records contained in the Tracking System. The Analyst enters case information into the Tracking System daily. Over 50 unique data fields are entered into the Tracking System for each fatal crash event. Each fatal crash record is divided into four main components:

- Common Data – This component includes data fields that pertain to the fatal crash, such as various file numbers, accident date and time, the investigating police agency and agency case number, the county in which the crash occurred, various flags, and more.
- Victim Data – This component includes data fields that pertain to the fatal victim, such as name, sex, age, date of birth, county in which the death occurred, various flags, and more.
- Driver Data – This component includes data fields that pertain to the driver, such as name, date of birth, age, sex, various flags, and more.
- EMS Data – This component includes data fields that pertain to the responding EMS, such as the times EMS was notified and arrived, the responding EMS, where the victim was taken to, and more.

The Analyst starts by entering the teletype information into the Tracking System. This includes basic crash information, such as date and time the crash occurred, the location the crash occurred, and details on each fatality.

After data from a new teletype has been entered into the Tracking System, the Analyst also enters the data into the FARS RBIS Early Notification module. The Early Notification module is a high-level overview of the crash and includes the crash date and time, number of fatalities, investigating agency and tracking numbers so the cases can be matched with the Tracking System.

Once a crash report is received from law enforcement, the Analyst updates the record in the Tracking System to include more detailed information such as indicators the crash occurred in a work zone, involved drugs or alcohol, the airbag was deployed, restraints were properly used, and details on vehicles and individuals that may not have been included in the teletype. The Analyst will update the record in the Tracking system when other reports, such as a BAC report or toxicology report, as they are received. Once the case has been coded, the Analyst logs her initials and the date coded into the record.

In addition to the Tracking System, the Analyst enters this additional data into the RBIS system. The RBIS is divided into 3 main tab categories, including:

- Crash – This tab category is divided into 5 sub-tabs with data fields relating to the crash and crash events, the trafficway, other relevant information and information related to special circumstances.
- Pedestrian – This tab is divided into 7 sub-tabs with data fields relating to non-occupants, pedestrian, non-motorist actions, alcohol and drug use, race, and other supplemental information. There can be more than one pedestrian tab for a crash record.

- Vehicle – This tab is divided into 4 sub-tabs with data fields relating to the vehicle involved, the driver involved, pre-crash information, and other person information. Each sub-tab is divided into further sub-tabs, and there can be more than one vehicle tab for a crash record.

For more information on data fields and available data, see the National Highway Traffic Safety Administration (NHTSA) FARS page and the FARS Encyclopedia. After the case has been completed in RBIS, the Analyst logs the date completed into the Tracking System and reviews the record to ensure all fields are complete.

In the event information is received from the Medical Examiner that a fatality occurred from causes other than the traffic crash, the case must be purged from FARS. The case file is pulled into a non-traffic folder and deleted from RBIS and the Tracking System. The Analyst also notifies the FDT so necessary steps can be taken to correct the corresponding State file.

2.2.3.1 System Specifications

The Oregon FARS Tracking System is a Microsoft Access database created and customized by the federal FARS contractor, NISR Inc. It was created in 2012 with no major enhancements made aside from minor updates made to reports by the FARS Analyst.

The FARS RBIS system is created and maintained by NHTSA for entering and storing fatal crash data as well as data about fatalities resulting from non-traffic crashes. Dates for when the system was created or last enhanced are unknown.

2.2.3.2 Key Challenges

Through a review of the Oregon FARS Tracking System, RBIS, and data input process, as well as interviews with unit staff, the following key challenges have been identified.

- Data security. Due to the format of the Tracking System Access database and its location in an internal drive available to anyone with access to this drive and can be edited by anyone with the appropriate permission levels, the data may not be as secure as data stored in the CDS SQL database.

2.2.4 Motor Carrier Crash Data Input

After the MCCA receives notification of a motor carrier crash, gathers all relevant documents, and does some initial review and analysis the data can then be entered into the federal SAFETYNET system. Over 100 unique data fields, including system-generated fields, are entered into SAFETYNET for each crash record. Data for each crash record is divided into 6 main tabs:

- Report/Location – This tab includes data fields that pertain to basic report information, such as report number, crash date and time, and reporting agency, as well as location details such as street/highway, city, and county in which the crash occurred.
- Carrier – This tab includes data fields that pertain to the Carrier involved, such as carrier type, USDOT number, carrier name, and address.
- Driver/Vehicle – This tab includes data fields that pertain to the driver, such as name, date of birth, and license information, as well as data fields pertaining to the vehicle, such as configuration, cargo body type, vehicle identification number, and license number. In addition, this tab includes fields related to hazmat vehicles, such as the presence of a hazmat placard, the hazmat class number, and more.
- Conditions/Events/Outcome – This tab includes data fields that pertain to crash conditions, such as the nature of the trafficway, access control, road surface, and weather and light conditions, as well as dropdowns indicating the crash event type for up to four events. In addition, this tab includes fields related to the crash outcome, such as the number of vehicles involved, the number of fatalities, and the number of persons medically transported.

- Notes – This tab provides a field wherein the MCCA can include any other pertinent information.
- Locally Defined Fields – This tab includes data fields that pertain to crash data codes, such as the route, direction, nearest city, state highway, milepoint and other various code indicators used for data queries. The tab also contains fields pertaining to crash details such as the amount of years and months the driver has been employed and counts of the types of individuals that were killed or injured. In addition, the tab contains data fields pertaining to data tracking, such as indicators that a police report, driver report, motor carrier report, or teletype were received, the date on which the MCCA sent a courtesy letter/request for compliance and the due date, and more. The fields in this tab were customized for use by ODOT by the previous MCCA.

Some validation rules are built into the system, including editing limitations once a record has been saved (for fields highlighted in blue on the system interface). Once the record has passed all of validation checks, the record is saved to the database.

Daily, at close of business, the MCCA uploads the data from the SAFETYNET system into the federal Motor Carrier Management Information System (MCMIS), managed for ODOT by the MCTD. The MCTD processes data in MCMIS and submits data to the Federal Motor Carrier Safety Administration.

Weekly, the MCCA updates three Microsoft Access databases with data from SAFETYNET, including a main database the MCCA uses for querying and reporting, as well as a crash details database and an outside database, both of which are used by ODOT inspectors for data querying. The queries within the latter two databases are created and maintained by the inspectors themselves. The process to update the Access databases involves deleting key tables, then importing the corresponding tables from SAFETYNET and re-establishing the relationships within the Access database. This is a manual process and the time taken can vary depending on if the MCCA is in the office or working remotely.

2.2.4.1 System Specifications

SAFETYNET is a distributed information management system consisting of a data entry interface and a centralized underlying Oracle 12c database. SAFETYNET 4.0 is the currently used version at ODOT. Dates for when the system was created or last enhanced are unknown, though no major enhancements appear to have been made in many years. Technical specifications of the data entry interface are unknown.

The FMCSA is currently undergoing a pilot/proof of concept for a new system called SafeSpect. The pilot launched in late March 2022 and is set to replace SAFETYNET and other related tools, including parts of the MCMIS. This will bring these applications up to current technology standards using a web-based user interface, making the system independent of the device or operating system being used. SafeSpect is expected to become available over the next few years.

2.2.4.2 Key Challenges

Through a review of the SAFETYNET system, related Access databases, and data input process, as well as interviews with unit staff, the following key challenges have been identified.

- Access database maintenance. The MCCA created and maintains three different Access databases using data exported from SAFETYNET for various querying and reporting purposes. These databases require weekly manual updates, the time taken can vary depending on whether the MCCA is working in the office or remotely. In addition, two of the three databases require weekly distribution ODOT inspectors. There is currently no automated process to update these databases.
- Data security. Due to the format of the SAFETYNET Access database and its location on an internal drive, extra care must be taken by the MCCA and other staff to ensure users are granted with the correct permission level needed (i.e., change or read-only access).

2.3 Quality Assurance/Quality Control Procedures

2.3.1 State File Crash Data QA/QC

At multiple times throughout the year, the CAR Unit Crash Analysts perform QA/QC procedures by utilizing various custom-built SQL queries ran against the reportable crash tables. The queries were created over time to address specific known problem areas within the crash data. Categories for these queries include:

- Alcohol/drug involvement – This category involves queries to identify crash records with null or invalid BAC report or marijuana use values, or crash records with inconsistent coding related to alcohol/drug involvement.
- Crash location – This category involves queries to identify crash records that may have errors or inconsistencies in various location fields and are most often related to fringe cases or differing rules for a specific city or county.
- Crash record duplication – This category involves queries to duplicated crash records that can match on a variety of fields.
- Fatal crashes – This category involves queries to identify fatal crash records with missing or invalid BAC or marijuana use values, identify fatal crash records where participants died prior to the crash, identify fatal crash records with missing police reports, as well as several queries used to reconcile fatal crash records with records in FARS.
- Functional classification – This category involves queries to identify crash records with null or incorrectly coded functional classification values, or crash records with inconsistent coding related to other location fields.
- Highway data elements – This category involves queries to identify crash records with null or incorrectly coded highway data elements such as highway component and milepoint, or crash records with inconsistent coding related to highway elements.
- Missing data elements – This category involves queries to identify crash records with key missing data elements such as crash- and vehicle-level causes and safety equipment used fields.
- Participants – This category involves queries to identify crash records with null or incorrectly coded participant fields in relation to each other.
- Vehicles – This category involves queries to identify crash records with null or incorrectly coded vehicle fields in relation to each other.
- Population – This category involves queries to identify crash records with a null population range code, or to determine if the table containing population range values needs to be updated for the year queried.
- Road control – This category involves queries to identify crash records with an incorrectly coded road control field in relation to other fields.

At the end of each coding year, most queries are manually re-run to ensure the quality and accuracy of the data prior to finalization and correct any remaining errors.

In the past, an extensive and time-consuming effort to perform geospatial QA/QC was undertaken prior to data finalization for the coding year. This effort involved running the raw crash data through a Feature Manipulation Engine (FME) Workbench created by the GIS Unit to add geospatial data to each record, followed by CAR Unit CDTs reviewing each crash location and making adjustments as needed. This often involved adjusting a crash location to within a few feet of distance from the location initially entered. It was recently determined that the cost of this intensive QA/QC procedure outweighed the benefit of the increased accuracy in location data, and so this process was greatly reduced.

2.3.1.1 Key Challenges

Through a review of the state file crash data QA/QC procedures, as well as interviews with unit staff, the following key challenges have been identified.

- Geospatial QA/QC has been reduced. In the past, CDTs performed extensive and time-consuming geospatial QA/QC processes, but these efforts have been recently greatly reduced. There is concern with some staff that this will result in less accurate crash location data.

2.3.2 State File Fatal Data Tracking QA/QC

There are two main QA/QC efforts for State File Fatality Tracking data. Monthly, the CAR Unit FDT compares the folder containing all fatal crash reports, the Fatality Tracker Access database, and the Microsoft Excel Fatal Log to ensure all required documents have been received. This is done in preparation for a regular monthly reconciliation effort between the FDT and the FARS Analyst. This effort involves reconciling the total number of fatal crashes, fatalities, urban/rural designations, crash locations, vehicle types and participant ages. This effort is taken to ensure the accuracy and consistency between the two systems and prepares both the FDT and the FARS Analyst to answer questions regarding any discrepancies.

2.3.3 FARS Data QA/QC

There are two main QA/QC efforts for FARS data. Monthly, the FARS Analyst works with the CAR Unit FDT to reconcile the number of fatal crashes, fatalities, and urban/rural designations. This effort is taken to ensure the accuracy and consistency between the two systems and prepares both the FDT and the Analyst to answer questions regarding any discrepancies. In addition, the Analyst works with the MCCA to reconcile the number of fatal crashes involving CMVs.

At the end of each coding year, quality control checks for accuracy and completeness of all the data received from the FARS offices is run by staff at the federal FARS Headquarters (HQ). FARS HQ then freezes the Master File so that final research, analysis, and reports can be published on the data for that year. This occurs in May of each year for quality control on the previous year's data. Once preliminary data has been extracted the Master File is reopened. On December 31 of the year after the coding year, the Master File closes and no further changes can be made (e.g., data for the 2021 coding year can be updated until December 31, 2022). The quality control process is the last opportunity for the Oregon FARS Analyst to verify the accuracy of their data before the FARS HQ Master File is closed.

The Oregon FARS office runs its own series of quality control checks after all FARS cases have been entered and are as near completion as possible. Quality control checks are made using the data retrieval systems, Crystal Reports, RBIS, and the FARS Intranet Site. These quality control checks include:

- Reviewing the Blank Elements Report – This report is generated through RBIS and provides a list of all cases with missing elements. The Analyst references this report while completing any elements that have yet to be coded.
- Reviewing the Errors Report – This report is generated through RBIS and provides a list of all potential fatal and pending errors. The Analyst references this report while updating the case until all fatal and pending errors are cleared.
- Ensuring all six Key Data elements have no more than 10% "unknown" codes – These Key Data elements include notification time for EMS, arrival time for EMS, EMS time at hospital, vehicle identification number coded "unknown", restraint use coded "unknown", and fatally injured drivers with alcohol test result coded "unknown".

2.3.4 Motor Carrier Crash Data QA/QC

There are two main QA/QC efforts for Motor Carrier Crash data. Monthly, the MCCA works with the FARS Analyst to reconcile the number of fatal crashes involving CMVs between the two databases.

In addition, the MCCA performs a yearly QA/QC process on data for the current reporting year. The MCCA uses the main Access database with data imported from SAFETYNET and runs a built-in query to return duplicated crash records and compares location details (particularly milepoints, counties, and highways) against the Highway Inventory Summary to check for accuracy. The MCCA reviews the queried data and makes corrections as necessary.

2.4 Data Reports, Requests, and Reporting Tools

2.4.1 State File Crash Data Reports and Requests

The CAR Unit generates hundreds of data products each year, including statewide publications and multiple formats of the annual crash database. These data products are used by a wide variety of partners, both internal and external to ODOT. For more information on data partners, see 2.5 Key Data Partners. The following is a partial list of the many data products developed by the CAR Unit.

- Ad-hoc crash summaries,
- Microsoft Access Decode Database,
- GIS Geodatabase,
- State Highway Crash Rate Books,
- Raw data extracts,
- Vehicle Direction Lists, and
- Traffic Crash Summary Books.

As mentioned in 2.2.1.1 Data Entry Process, data in the CDS is divided into preliminary and final data. Preliminary data, up to a release date determined by the CAR Unit Manager in consultation with the Senior Crash Data Analyst (CDA) and the CDT Team Lead, can be accessed through the TransViewer tool. This data must be identified as preliminary within the tool. In addition, the Crash Data Reporting Technician (CDRT) can use the CDS to produce reports using the preliminary data up to the release date. This date is not programmed into the system, so the Reporting Technician must take care not to include data past the release date in any reports.

2.4.1.1 State File Crash Data Requests

The CAR Unit processes approximately 400-500 data requests per year with an average turn-around time of 2 weeks. Each data request is unique, and the processing time can vary depending on the complexity and urgency of the request. Responding to a data request may include sharing raw crash data for a local jurisdiction, running a custom query to answer a specific question about statewide crash trends, or utilizing one of the hundreds of standard queries maintained by CAR Unit staff. Data can be provided in nearly any standard data format, including text, Microsoft Excel, Microsoft Access, PDF, and Geodatabases and Shapefiles. In many cases, the CDS Reporting functions are used to generate reports to respond to data requests. See 2.2.1.4.2 Reporting Functions for more information.

Requests are sent to via email to the CAR Unit Crash Request Group and are assigned according to the complexity of the request. Simple requests such as a request for a list of crashes occurring at a given intersection, which are the most common, are processed by the CDRT. More complex requests, such as those pertaining to comparative or categorical data are processed by the CDAs as they often require more subject matter expertise and experience in creating data queries.

2.4.1.2 Key Challenges

Through a review of the crash data request fulfillment process, as well as interviews with unit staff, the following key challenges have been identified.

- Query maintenance. The CAR Unit maintains hundreds of SQL queries to facilitate crash data reporting stored in the CDS, resulting in a heavy reliance on the institutional knowledge and technical capabilities of a few select staff.

2.4.2 State File Fatal Crash Data Reports and Requests

The CAR Unit FDT uses the Fatality Tracker Access Database to generate a variety of reports, including:

- National Safety Report – This report provides a monthly count of urban, rural, and total fatalities for the year up to the given date for dissemination to the National Safety Council.
- Removed Fatals Report – This report provides a list of all fatalities that were removed from the Fatality Tracker for a given year and includes high-level details on the crash location, previously entered fatality, and actual cause of death. This report is primarily used in-house for data reconciliation efforts with the FARS Analyst.
- Missing DMV Number Report – This report provides a list of all fatal crash records with a missing DMV Serial Number. This report is primarily used in-house for data reconciliation efforts with the FARS Analyst, as well as a reference to request missing report numbers from the DMV.
- Missing Police Report – This report provides a list of all fatal crash records with a missing police report. This report is primarily used in-house for data reconciliation efforts with the FARS Analyst, as well as a reference to request missing police reports from the DMV.
- Missing BAC Report – This report provides a list of all fatal crash records with a missing Blood Alcohol Content (BAC) test result. This report is primarily used in-house for data reconciliation efforts with the FARS Analyst, as well as a reference to request missing BAC reports from the appropriate parties.
- By Month Cumulative Report – This report provides a cumulative count of total fatalities by month, including month-to-date and year-to-date totals for a given year.
- Pedal cycle Cumulative Report – This report provides a cumulative count of total pedal cycle fatalities by month, including month-to-date and year-to-date totals for a given year.
- Work Zone Cumulative Report – This report provides a cumulative count of total work zone fatalities by month, including month-to-date and year-to-date totals for a given year.
- Motorcycle Cumulative Report – This report provides a cumulative count of total motorcycle fatalities by month, including month-to-date and year-to-date totals for a given year.
- Pedestrian Cumulative Report – This report provides a cumulative count of total pedestrian fatalities by month, including month-to-date and year-to-date totals for a given year.
- Statewide Total Cumulative Report – This report provides a cumulative count of total fatalities by day of month and day of year, including month-to-date and year-to-date totals for a given year.

In addition, the FDT uses the data in the Fatality Tracker to update the ODOT Initial Fatal Information List. This spreadsheet is updated manually and distributed as new crash reports are received to an email distribution list that the FDT maintains. As it contains personally identifiable information (PII), its distribution is limited to those with a need-to-know including internal and external customers. The file contains 6 sheets, including an instructions sheet, lookup table sheet, and the following data sheets:

- DATA ALL – This sheet provides initial crash records for the past 4 years plus the current year. Text shown in blue indicates a change in data and cells highlighted red indicate more than one fatality had occurred for that crash record.

- Fatalities – Agency Pivots – This sheet provides pivot tables showing the number of fatalities categorized by region and county per year, and region, county and reporting agency per year.
- Fatalities – Crash Type Pivots – This sheet provides pivot tables showing the number of fatalities categorized by crash type per year, region and crash type per year, and region, county, and crash type per year.
- Fatalities by Region – This sheet provides a pivot table showing the number of fatalities categorized by region per year.

The FDT rarely receives data requests, and those received are either forwarded to the CAR Unit Crash Request Group or to the FARS Analyst, depending on the nature of the request. See 2.4.2 State File Fatal Crash Data Reports and Requests for more information.

2.4.2.1 Key Challenges

Through a review of the state file fatal crash reports and reporting processes, as well as interviews with unit staff, the following key challenges have been identified.

- Manual report maintenance and distribution. The FDT routinely manually updates the ODOT Initial Fatal Information List and enters the latest crash records into a sheet using data from multiple tables in the Fatality Tracker Access Database. Annually, the FDT must also manually update the spreadsheet to remove the previous year's data in preparation for the upcoming year to maintain the number of years for which crash records are included. This report must also be manually distributed to an email list. This can be a time intensive effort that could benefit from automation.
- Report query creation and maintenance. Due to a general lack of staff expertise, creating new queries or performing any major query updates is difficult without more intensive training opportunities.
- Perceived fatal data inconsistency. Fatal data is entered by the FDT, the FARS Analyst, and the MCCA (for fatal CMV reports) into three different systems (Fatality Tracker, Oregon FARS Tracking System, and SAFETYNET respectively) with varying coding procedures and data definitions. While data is shared among the three of them during the collection process, and reconciliation efforts are taken, this can result in perceived inconsistency most notably for final data counts, requiring staff to be able to explain the inconsistencies.

2.4.3 FARS Data Reports and Requests

The FARS Analyst creates and distributes various reports monthly, including the Monthly Preliminary Fatality Count (described in detail below) and various Tracking System reports. Tracking System reports include:

- Motorcycle Fatalities/ATV to Date
- Work Zone Fatalities to Date
- Pedestrian Fatalities to Date
- Pedal Cyclist Fatalities to Date
- Youthful Driver Crashes to Date (drivers under the age of 21)
- Medium/Heavy Truck Report
- ATV/ROV/Snowmobile Fatalities to Date

All Tracking System reports contain data fields such as crash date and time, county, location, an alcohol-involved indicator, age, and sex, as well as other fields related to the specific report type. These are distributed to a number of interested parties within ODOT.

The Analyst does not generally receive requests directly. Requests go to the CAR Unit Crash Request Group, and responders may reach out to the Analyst for data if necessary. See 2.4.3 FARS Data Reports and Requests for more information.

2.4.3.1 Monthly Preliminary Fatality Count

The Monthly Preliminary Fatality Count (MFC) is sent to an ODOT distribution list monthly, with a goal of being sent on or around the 15th of each month. To assist in the creation of this report, the Analyst creates a spreadsheet containing monthly fatalities to keep on-hand for quick reference. To prepare for the report, the Analyst first ensures all teletypes have been entered into the Tracking System and works with the CAR Unit FDT to ensure the latest teletypes have been received.

The Analyst then runs various reports from the Tracking System and compares these reports to the spreadsheet. The analyst then adds the latest full-month's figures from the related Tracking System report into the spreadsheet for the current year, making sure the formulas compute the new totals correctly.

Once the data sources are reconciled and the Analyst is sure the data is correct, the data can be updated in the Monthly Counts section of RBIS. Once these updates are made, and the Analyst has reconciled the numbers in RBIS and the spreadsheet, the spreadsheet can be distributed as the updated Monthly Fatality Count Report.

2.4.3.2 Key Challenges

Through a review of the FARS reports and reporting process, as well as interviews with unit staff, the following key challenges have been identified.

- Report distribution. It is unclear to customers how to request to be added to the various distribution lists to receive monthly FARS reports. In addition, while the goal is to send out certain reports on or around the 15th of each month, the distribution cadence has been irregular. Both staff and recipients could benefit from report automation.
- Perceived fatal data inconsistency. Fatal data is entered by the FDT, the FARS Analyst, and the MCCA (for fatal CMV reports) into three different systems (Fatality Tracker, Oregon FARS Tracking System, and SAFETYNET respectively) with varying coding procedures and data definitions. While data is shared among the three of them during the collection process, and reconciliation efforts are taken, this can result in perceived inconsistency most notably for final data counts, requiring staff to be able to explain the inconsistencies.

2.4.4 Motor Carrier Crash Data Reports and Requests

The CAR Unit MCCA uses the main Microsoft Access database, with data imported from SAFETYNET, to generate a variety of reports, including:

- Monthly Comparison report – This report provides monthly counts of Motor Carrier crashes in various categories, including total crashes, injuries, deaths, truck-at-fault crashes, and more. These counts include a comparison to the month from the previous year as well as percent change figures. In addition, this report gives comparisons for the entire year against the previous year as well as percent change figures for the various categories. This report also includes the current year's crashes to date by county, and details on crashes where the Carrier was at-fault for Oregon and out-of-state Carriers, as well as details on crashes where the Carrier was not at-fault. It is generated monthly.
- Hazmat Spills report – This report provides details on hazardous materials spills or releases from 1992 to the current year. It is updated monthly using data from SAFETYNET.
- Motor Carrier Traffic Crash Quick Facts report – This report provides counts of all Carrier crashes in various categories, such as fatal crashes, non-fatal transported injury crashes, property damage only crashes, crashes where drugs or alcohol were involved, and more. It also provides summarized data to

indicate the most common collision types for fatal and all other crashes, as well as the peak month, day, and time for Carrier crashes. It also provides counts of total crashes, injuries, and fatalities by truck configuration and the top ten errors for truck-at-fault and truck-not-at-fault crashes. It is generated annually.

- Three-Year Motor Carrier Crash Comparison report – This report provides a comparison of counts and rates of Carrier crashes over a three-year period, including comparisons of the number of fatalities, injuries, truck-at-fault crashes, and more. It is generated annually.
- Statistics for the ODOT Commerce and Compliance Division Safety Action Plan – The statistics provided for this plan include a high-level summary of CMV crashes for the current year compared to the previous year, a summary and counts of truck crashes by various fault categories, counts of crashes by truck configuration, counts of various causes for truck-at-fault crashes, a summary of the truck-at-fault crash rate for the current year, and more. The MCCA provides these statistics annually.

In addition, the MCCA receives and responds to Motor Carrier Crash data requests. The requests usually come from Motor Carrier, and the MCCA uses various queries in the main Access Database to fulfill the requests. The MCCA will occasionally need to modify an existing query to suit the needs of the request. Requests from other parties are very rare but are processed similarly using the Access database queries.

2.4.4.1 Key Challenges

Through a review of the Motor Carrier Crash reports and reporting process, as well as interviews with unit staff, the following key challenge was identified.

- Perceived fatal data inconsistency. Fatal data is entered by the FDT, the FARS Analyst, and the MCCA (for fatal CMV reports) into three different systems (Fatality Tracker, Oregon FARS Tracking System, and SAFETYNET respectively) with varying coding procedures and data definitions. While data is shared among the three of them during the collection process, and reconciliation efforts are taken, this can result in perceived inconsistency most notably for final data counts, requiring staff to be able to explain the inconsistencies.

2.4.5 Crash Data Tools

ODOT currently supports multiple tools that either provide, manipulate, or present crash data. Several of the tools provide redundant functionality, and crash data exploration is just one of many functions. The tools can be categorized into three major categories: Data Processing, Storage, and Reporting tools; Data Visualization tools; and Data Investigation and Analysis tools.

2.4.5.1 Data Processing, Storage and Reporting Tools

This category of tools includes those developed by ODOT that are used to process, store, or access raw crash data.

Crash Data System

See 2.2.1 Crash Data System for details about the CDS.

Enterprise Data Warehouse

The ODOT Enterprise Data Warehouse (EDW) is a centralized data storage system that allows for the querying and integration of multiple data sources. The EDW is intended to be accessible to ODOT staff only and there are no plans for access by external users, although ODOT-owned outward-facing tools may query data housed in the EDW. It allows for easier querying and report-building and can also be used with SQL Server Reporting Services (SSRS) for automated reporting. The EDW houses the most recent 10 years of available crash data.

The EDW was implemented in 2019 with a most recent enhancement in 2020. It is a SQL 2017 database that is supported by ODOT's Business Intelligence and Data Warehouse (BIDW) Unit.

TransViewer

The TransViewer online portal allows end-users to directly access crash data in a variety of formats. Although it was initially intended for internal ODOT use, it is also extensively used by external users (including local agencies, consultants, and academia).

Crash data can be obtained for specific roadways, roadway segments, intersections, or entire jurisdictions. TransViewer allows users to download all available crash data, as far back as 1985. The most recent year of data is typically denoted as "preliminary" until a full year is entered and reviewed through the CAR Unit's QA/QC process.

TransViewer provides a means of accessing ODOT crash data without submitting a request to the CAR Unit. As it was developed primarily for internal use, it is more user-friendly when querying state highways than local roads. Depending on the format of the data that is desired, extensive post-processing and technical skills are required to get the data into a usable format for analysis.

The tool was implemented in 2010 with a most recent enhancement in 2019. It is a .NET application supported by EAS.

2.4.5.2 Data Visualization Tools

This category of tools includes those developed by ODOT for visualization of different data sets, including crash data. These tools generally provide snapshots of data but cannot be modified, queried, or filtered (beyond turning layers of data on or off). These tools are typically used for high-level monitoring or information gathering as opposed to detailed analysis.

TransGIS

TransGIS is a web-based interactive mapping application used to identify specific locations and perform fundamental geospatial analysis. This tool can be used by ODOT staff and external users to support analysis, planning, research, and many other business needs.

TransGIS layers present a simplified view of the point locations and summary data for the most recent five years of available crash data.

The tool was implemented in 2009 with a most recent enhancement in 2021. It is a React web application utilizing the ArcGIS API for JavaScript version 4.x and is supported by EAS and the GIS Unit.

FACS-STIP

The Features, Attributes, and Conditions Survey and Statewide Transportation Program (FACS-STIP) tool consists of mapping and data retrieval components. The mapping component is an updated web-based version of the STIP scoping tool. The data retrieval component allows any area of interest to be selected using highway, milepoint, and roadway identification information. The tool is used to retrieve ODOT's current highway attribute inventory and is intended to aid in project delivery including the scoping of STIP projects. It is only accessible to ODOT staff.

The tool includes layers that provide a simplified view of the point locations and summary data for the most recent five years of available crash data.

The tool was implemented in 2011 with a most recent enhancement in 2020. It is a .NET web application utilizing the ArcGIS API for JavaScript version 3.x and is supported by EAS and the GIS Unit.

OTC Dashboard

The Oregon Transportation Commission (OTC) Dashboard specifically utilizes crash data to display the current and recent trends in fatal crashes as part of ODOT performance monitoring. The tool can be used to track and analyze key performance measures and move towards data-driven decision making. It is publicly available, though primarily used by ODOT staff.

Safety data is included in the OTC Dashboard as a means of tracking the effectiveness of different safety programs across the state. Safety factors monitored include traffic fatalities, serious injury crashes, large truck crashes, rail crossing incidents, and derailment incidents.

This tool was implemented in 2016 with a most recent enhancement in 2019. It is a Tableau dashboard supported by the ODOT Performance Management Office.

2.4.5.3 Data Investigation and Analysis Tools

This category of tools includes those developed by ODOT, local agencies, and private parties to support the investigation and analysis of crash data. Many of the tools include a visualization component but provide more complex functionality than those in the Data Visualization category.

Safety Priority Index System

The Safety Priority Index System (SPIS) is a systematic scoring method that identifies potential safety concerns on state highways and local roadways. The SPIS score is based on three years of crash data and considers crash frequency, rate, and severity. A roadway segment becomes a SPIS site if a location has three or more crashes, or one or more fatal crashes over the three-year period. ODOT generates reports of the top 15%, 10%, and 5% of SPIS sites each year. The reports are used to evaluate the safety problems which may contribute to the crash history at the SPIS locations, and the top 5% sites are investigated in further detail. SPIS lists are publicly available, and primary used by ODOT staff and local agencies.

SPIS utilizes the most recent three years of available crash data to conduct all calculations and reports. Calculations are dependent on the frequency and severity of crashes, and exposure levels (traffic volume).

SPIS was first implemented in 1986 with a most recent enhancement in 2019. It is a C# application supported by EAS and the GIS Unit.

Oregon Transportation Safety Data Explorer

The Oregon Transportation Safety Data Explorer (OTSDE) is a GIS web application that supports the All Roads Transportation Safety (ARTS) program. The ARTS program aims to identify the most beneficial engineering projects to improve traffic safety on Oregon roads, with an emphasis on reducing fatal and serious injury crashes. OTSDE's main capabilities include corridor visualization, crash data filters, an active transportation data viewer, and the ability to select and export crash data. It is publicly available and intended for use by ODOT staff, local jurisdictions, and consultants to identify potential ARTS project locations and diagnose underlying safety concerns.

The tool includes a GIS layer of the most recent five years of available crash data, as well as functionality that allows crash data to be downloaded in different formats.

The tool was implemented in 2018 with a most recent enhancement in 2019. It is an ArcGIS Online application supported by the GIS Unit.

Oregon Adjustable Safety Index System

The Oregon Adjustable Safety Index System (OASIS) was created as an online tool that is capable of performing safety analysis similar to the SPIS and allows users to vary the underlying calculations. The tools allow the user to run custom safety analyses that may better suit the needs of a specific safety investigation than the traditional SPIS evaluation. It is used for network screening and to identify locations that warrant further investigation. It is publicly available and used primarily by ODOT staff, local agencies, and consultants.

The tool runs all analyses and queries on the most recent three to five years of available crash data. All adjustments to the OASIS calculations are completed through a filtering of the crash data and adjustments to the weighting factors.

The tool was implemented in 2011 with a most recent enhancement in 2017. It is a .NET web application supported by the TAD Unit.

Crash Data Viewer

The Crash Data Viewer (CDV) is a proof of concept and provides data visualization of crash data across the state and allows users to download a subset of data that meets all criteria defined through various filters, similar to the OTSDE tool. It also includes a map component that shows the point location of crashes, with points color-coded by injury severity. The CDV gives users the ability to answer specific questions without needing advanced technical skills or access to raw crash data. It is currently only available to select users within the CAR Unit and other ODOT staff for review and testing, as it is still in development.

The CDV utilizes the most recent ten years of available crash data and once development is finished, it may be made publicly available. It is expected that the tool will reduce the data reporting requests that currently must be processed by CAR Unit staff, particularly if raw data exports can be downloaded.

Development on the CDV started in 2018, with a most recent enhancement in 2022. It is a Tableau dashboard supported by the CAR Unit.

Non-ODOT Investigation and Analysis Tools

There are several investigation and analysis tools created outside of ODOT that consume crash data. These tools are created by local agencies or consultants for use by ODOT, local agencies, and the general public. They generally include crash data mapping and various filtering and selection capabilities and tend to utilize the most recent ten years of available crash data.

2.4.5.4 Key Challenges

Through a review of the various crash data tools, as well as interviews with unit staff, the following key challenges were identified:

- No true one-stop-shop for crash data. ODOT currently supports multiple tools that either provide, manipulate, or present crash data, however there is no singular tool available to address crash data needs.
- Difficulty of tool utilization. Many of the tools provided, in particular the TransViewer portal, are not intuitive for users and many data formats require extensive post-processing and technical capabilities to utilize. Users with limited capabilities are unable to easily obtain the data or answers they need through the current self-service tools, which may deter safety-related efforts all together. This also results in increased data requests submitted to the CAR Unit. This challenge may be addressed by the Crash Data Viewer dashboard that is currently in development.

2.5 Key Data Partners

There are a number of key data partners, both internal and external to ODOT, that utilize crash data primarily for project-level analysis (such as engineering, planning, and research) and high-level decision making (such as performance monitoring, policy making, and public outreach). Internal partners can include staff from the Director's Office, Communications, Transportation Safety Office, Delivery and Operations Division, Transportation Planning and Analysis Unit, Regions, and more. External partners primarily include local agencies such as counties and cities, as well as local bureaus of transportation.

2.5.1 Data Usage

Data partners use crash data in a variety of ways. In general, partners within the statewide divisions of ODOT tend to use the data to answer higher-level questions, while local agency and ODOT Region partners use the crash data for both high-level questions and detailed investigations. The data is primarily used in the following cases:

- For performance monitoring to meet state and federal requirements (e.g., the Transportation Safety Action Plan and the Transportation Safety Performance Plan)
- To inform discussions and decision making at the policy and legislative levels
- To support and implement statewide safety programs (e.g., ARTS and SPIS)
- To conduct in-depth safety investigations and crash analyses to diagnose crash risks and contributing factors at specific locations (e.g., intersections or corridors)
- To aid in the selection and design of capital improvement projects and estimation of cost effectiveness (e.g., benefit-cost evaluations)
- For system monitoring and network screening at the local or state level to identify locations with high frequency or high severity of crashes or notable crash patterns (e.g., specific crash types or contributing factors)
- To respond to media requests

Crash data serves a critical role in decision making across all levels of state and local governments, including where and how to invest in transportation improvements. While there are many opportunities for improving crash data, changes to the dataset will affect each user differently and careful consideration must be given prior to eliminating any data elements.

2.5.2 Data Access

ODOT crash data can be obtained in three primary ways – direct requests to the CAR unit, annual publications (data extracts or geodatabases), and the TransViewer portal where raw data can be downloaded, in addition to other data tools. Data partners internal to ODOT primarily obtain data through direct requests to the CAR unit, while external partners primarily use the annual publications and TransViewer.

The most commonly used tools to visualize, manipulate, query, or analyze crash data are Excel (including pivot tables, charts, graphs, and filtering), Access, Tableau, and GIS. Other tools include R (statistical analysis software), Google Fusion Tables and Maps, and SQL. A few partners use customized safety analysis tools, like ODOT Safety Investigations Manual spreadsheets (ODOT Region 2) and the Vision Zero Suite (Clackamas County).

2.5.3 Data Manipulation or Refinement

Data partners who use the data for higher-level decision making and performance monitoring typically use the data exactly as provided by the CAR unit. Other partners, particularly those who conduct more in-depth safety analysis, tend to manipulate the data by creating new fields or merging existing fields (though partners do not change values within existing fields). Commonly added fields include the following:

- Crash severity using KABCO scale,
- Single decimal values for latitude and longitude for easier integration with mapping tools,
- Combined collision/crash type field to easily identify bicycle crashes, and

- Flags or indicator variables for PDO crashes, motorcycle crashes, heavy vehicle crashes, pedestrian/cyclist involvement, intersection crashes, roadway departure crashes (as well as centerline-crossing crashes), human-vehicle-environmental contributing factors, and specific contributing factors (like speeding or distraction).

The fact that none of the partners edit the fields within the crash database is a testament to the quality and accuracy of crash data in Oregon. All of the data manipulation that takes place is to create more user-friendly fields based on data that already exists.

3 Justification for and Nature of Changes

3.1 Justification of Changes

As crash data in Oregon is used in a wide variety of ways and serves a critical role in decision-making across all levels of state and local governments, it is critical that ODOT provides the most accurate and timely crash data possible. While crash coding accuracy remains one of the highest in the country, the timeliness of processing, quality assurance/quality control (QA/QC) procedures, and release for distribution and reporting is challenged by the current crash data processes and systems in use at ODOT. In particular, the age of the main Crash Data System (CDS), as well as a lack of technical support, prevents any meaningful improvements from being made. All of these issues and gaps result in major delays from the time a crash occurred to the time data related to that crash is released.

The following subsections summarize the challenges and limitations within the crash data processes and systems as identified through key data partner engagement, the stated desire for changes, as well as the rationale for these changes.

3.1.1 Data Collection

Through a review of the various data collection processes within the Driver and Motor Vehicle Services (DMV) Crash Reporting Unit (CRU) and the Crash Analysis and Reporting (CAR) Unit, as well as interviews with unit staff, several key challenges have been identified and are summarized below.

3.1.1.1 Excessive Time Taken to Submit and Process Crash Reports

Timeliness is a challenge that impacts all aspects of crash data. Drivers are required to submit a crash report to DMV within 72 hours of a reportable crash (per Oregon Revised Statute (ORS) 811.720) and law enforcement agencies are required to report any crash they investigate to DMV within 10 days of the investigation or preparation of the report (per ORS 810.460). However, in reality it can take several weeks for the crash to be reported to DMV by a driver, and up to several months to be reported by law enforcement. From there, it can take between 2-8 weeks for a crash not involving a fatality or a Commercial Motor Vehicle (CMV) to be processed by CRU depending on workload. Overall, it can take 3months to 1 year from the time the DMV receives a crash report to the time the imaged reports are made available to the CAR Unit.

Impact of Fatal Crash Report Delays

The delay in receiving reports from law enforcement, particularly when those reports contain fatalities, results in further delays in the CAR Unit Fatal Data Technician's (FDT) fatal data tracking processes. In some cases, no police report is ever generated, received, or a report may be held from release. This includes notifying the Fatality Analysis Reporting System (FARS) Analyst of a fatal crash. The FARS Analyst is required to submit FARS data to meet certain federal benchmarks, and these delays require extra, occasionally time-intensive processes to request copies of reports from various parties. In addition, there are often delays in the FARS Analyst receiving other various lab reports, which also negatively affects the ability to meet benchmarks.

Impact of CMV Crash Report Delays

Prior to November 2022 when the DMV CRU sorted received crash reports and identified those involving CMVs, they did not utilize the sections of the report that can indicate a federally reportable CMV was involved. This resulted in the federally reportable CMV crash reports being sent through standard processing and a considerable delay in when they are made available to the Motor Carrier Crash Analyst (MCCA). The MCCA then had to review all reports received and identify which involved a federally reportable CMV, which was time intensive. In response to the U.S. DOT's Federal Motor Carrier Safety Administration's (FMCSA) anticipated lowering of federal reporting requirements from 90 days to 45 days, short-term process changes have been put into place. These changes involve a temporary resource assigned to the DMV CRU to identify crashes involving a federally reportable CMV and fast-track the report copies to the MCCA, as well as a CAR Unit resource temporarily and partially being re-assigned to help address the backlog of CMV crash coding. Long-term process changes and resource allocation are still in discussion but are expected to include either the Motor Carrier Division funding a second MCCA resource to help with report sorting and coding or retiring the state CMV crash form and relying on crash reports from law enforcement.

3.1.1.2 Inefficiencies and Inconsistencies of Submitted Crash Reports

Currently, drivers must submit crash reports via an inefficient, paper-focused reporting process. A driver may complete the form by hand or electronically through a fillable PDF, but as there is not an option to electronically sign the form, the driver must have access to a printer and scanner to then email it or be able to physically mail the form to DMV. Forms filled out by hand are often difficult to read or interpret and also are not always complete, as drivers have also expressed that the form fields are confusing and difficult to fill out which can result in missing data. DMV is, however, currently developing an application to allow the electronic submittal of crash reports, with availability to the public expected in August 2023. This application is expected to alleviate many of these issues.

Other difficulties arise with crash reports submitted by law enforcement. Different law enforcement agencies may have different policies and training in regard to filling out accident reports, which can result in incomplete and inconsistent data. The system many agencies use to submit crash reports allows for the officer to indicate or harvest the crash location, however many officers leave the scene of the crash and often return to the police station or move to another location to complete the report which can result in inaccurate location data being provided. In the case of missing or late reports, the impact used to be somewhat mitigated by a process in which the FDT created an unofficial teletype to send to DMV as an initial indication that a fatal crash has occurred which then prompted DMV to reach out to the appropriate law enforcement agency for an official report. This process, however, is no longer in practice as DMV no longer accepts the unofficial teletypes as initial indicators of a fatal crash. As a result, there is further delay in receiving some fatal crash reports. There are also instances where law enforcement officials hesitate to or deny the release information as it may impact ongoing litigation.

3.1.2 Data Input

Through a review of all data management systems including the CDS, Crash Locator Tool (CLT), Fatality Tracker Database, Oregon FARS Tracking System, Records-Based Information Solution (RBIS) system, SAFETYNET system and related Access databases, and the Motor Carrier Management Information System (MCMIS) as well as data input processes and interviews with unit staff, several key challenges have been identified and are summarized below.

3.1.2.1 Difficulties Accessing and Interpreting Crash Reports

Through a group interview with the CAR Unit Crash Data Technicians (CDTs), a variety of difficulties in accessing and interpreting crash reports were identified. Challenges with accessing crash reports primarily concerned limitations with the FileNet system that CDTs utilize to retrieve crash reports provided by DMV. The limitations noted included inconsistent system time-out intervals resulting in the system ending the user session seemingly at random, as well as the built-in PDF previewer displaying with too low of a resolution for the CDT to read key sections of the report with no way to zoom in to increase clarity. This often requires the CDT to download the report to their local computer and open it with a separate PDF viewing program instead, which takes additional time and results in file duplication and personally identifiable information (PII) concerns.

Challenges with interpreting crash reports arise from the report containing incomplete or inaccurate information, and the readability of driver reports filled out by hand. Sections of the report that CDTs noted that drivers appear to have difficulties filling out include direction of travel, passenger information, and the vehicle damage and crash location diagrams. Sections of the reports from law enforcement that CDTs find difficulty in interpreting include direction of travel, driver factors, inaccurate latitude and longitude values, as well as entire pages missing information or comments lacking any additional context.

3.1.2.2 Difficulties Learning to Use the Crash Data System

When a new CDT is brought on board, they must undergo extensive training before being able to use the production CDS. This training takes 4-6 months on average and involves working directly with the CDT Team Lead to learn how to code a wide variety of crashes and enter them into the CDS. This process can be inefficient at times as it depends heavily on the availability of a singular resource. There are no training modules or resources built into the CDS itself, so CDTs must rely on the Team Lead and external resources such as the CDS Code Manual and various cheat sheets not only during training but throughout their day-to-day coding work.

In addition, during the training period the CDT utilizes a test version of the CDS. This test CDS connects to a test database that contains a snapshot of crash data for training purposes. As a result, two separate systems and databases must be maintained at the same time.

3.1.2.3 Difficulties Entering Data into the Crash Data System

Currently there is no way to directly import data from the crash reports into the CDS, making data entry a strictly manual process. This is often time-intensive, both due to the nature of the work and to the limitations of the system itself. Through a group interview with the CAR Unit CDTs, a variety of difficulties in using the CDS and the associated CLT were identified. All of the CDTs interviewed reported display issues with the application such as the views being cluttered and unable to adjust to varying screen sizes and resolutions. When entering data, CDTs reported that they find the system can be very sluggish – if a CDT is entering data faster than the system can handle, they may find data entered into the wrong fields and have to go back and manually correct it. CDTs also reported unhelpful behavior such as fields being skipped while tabbing through if they had caps lock on, as well as not being able to click directly into the participant or vehicle sections of the screen and instead needing to click into the last field of the previous section and tab into the next.

In regard to user experience with the CLT, CDTs noted that the consistency in availability of the tool was an issue. Occasionally, when a CDT goes to add crash location data the CLT will not load fully or will appear to load normally, only for the basemap to disappear upon zooming in or for the tool to freeze. This prevents the CDT from selecting an accurate location for the crash and causes an overall delay in the coding process. The CDTs also noted a common difficulty they experience with the CLT is a difference in the naming convention of streets in the CLT compared to the CDS, which can cause confusion and a slight delay in determining the crash location. In addition, CDTs reported unexpected behavior such as the tool crashing upon certain user interactions. Some of these issues may be resolved with the next major tool update which is expected to go live as early as December 2022.

Another issue CDTs experience related to indicating a crash location involves inconsistent road network data. The road network data maintained and used in the CDS is not consistent with other data sources or tools within the Transportation Data Section, including the CLT. As there is currently no way to import the road network data from another source, the data within the CDS must be maintained manually and CDTs often end up coding crashes to an outdated road network. In addition, CDTs noted difficulty reconciling between street names in the CLT and in the CDS as the data becomes out of date. This results in a need for extensive quality QA/QC measures and manual updates to be undertaken when the new road network data is released.

CDTs also reported issues when validating and saving data. Due to limitations with the built-in validation rules, certain fields such as weather condition, road surface, and lighting condition tend to generate false errors on a regular basis. When validating a record, the system must connect to the primary database to retrieve various validation rules and check the data against them which can take a long time depending on the complexity of the crash record. There is also no way to save an "in-progress" crash record without having added at least one participant and vehicle record and without having to go through the full validation process, which requires the CDT to be very conscious of time management.

Also on occasion, the CDS itself has gone down and become unavailable for one or more days at a time. In these instances, CDTs are required to code crashes manually to a paper version of the data entry screen then manually reenter all of that data into the CDS when the issue is resolved, and the system is once again available. In the most recent instance of this occurrence, the majority of CDTs were working remotely and did not have access to sufficient paper data entry sheets. As a result, a staff member developed a PDF version of the data entry sheet which the CDTs now use instead. However, there is no ability for the system to import that data directly from the PDF, so the manual additional data entry still must be undertaken. This results in overall delays in the coding process.

These limitations are perpetuated by an aging and unsupported system. The CDS was built using Visual Basic 6 (VB6), which reached its end-of-life in 2008 and is no longer supported by Microsoft. This makes any enhancements to the application, beyond basic maintenance tasks, difficult to impossible to perform. As a result, the CDS has a long backlog of requests for work that are going unaddressed, both due to the nature of the system's platform as well as staffing constraints. As none of the original developers involved in the implementation of the CDS remain at ODOT, we must rely on incomplete documentation that has not been updated in a decade for any background technical information about the system. Overall, the CDS just barely meets current business need and has no way to meet future needs.

3.1.2.4 Lack of Integration between the CDS and Other CAR Unit Data Entry Systems

The FDT tracks all fatal crashes within the Fatality Tracker Access Database, which is entirely separate from the CDS. There is no way for this system to be integrated or interact with the CDS and the FDT and CDTs rely on each other to relay any data changes that must be captured in the respective systems. Similarly, there is no way to integrate the CDS with other systems used by the FARS Analyst such as the Oregon FARS Tracking System and RBIS, or by the MCCA such as SAFETYNET. To avoid data inconsistencies, staff must work together to reconcile number of fatal crashes and fatalities, as well as fatal crashes involving CMVs to ensure the accuracy and consistency between the various systems and be able to answer questions regarding any discrepancies. These additional efforts could be mitigated with a more integrated set of systems.

In addition, due to the format of the Fatality Tracker, the Oregon FARS Tracking System, and the SAFETYNET system as Access databases, as well as their respective locations on internal network storage locations, extra care must be taken to ensure the data cannot be accessed and edited without the appropriate permissions. As a result, the data is not as secure as data stored in the SQL database associated with the CDS. This too could be corrected with more system integration.

3.1.3 Quality Assurance/Quality Control Procedures

Through a review of the state file crash data QA/QC procedures, as well as interviews with unit staff, several key challenges have been identified and are summarized below.

3.1.3.1 Extensive QA/QC Procedures

At multiple times throughout the year, the CAR Unit Crash Analysts perform QA/QC procedures by utilizing a large amount of custom-built Structured Query Language (SQL) queries ran against the reportable crash tables. At the end of each coding year, most queries are manually re-run to ensure the quality and accuracy of the data to correct any remaining errors prior to the release of final data. These queries were created over time to address specific known problem areas within the crash data which are the result of insufficient or inaccurate built-in validation rules. This process depends on very limited resources with the necessary in-depth knowledge and understanding of the data and the system itself. In addition, the time-intensive nature of the process negatively impacts the amount of time it takes to release final crash data.

3.1.3.2 Lack of Geospatial Capabilities at the Source

The CDS is not a geospatially enabled system. While another tool has been developed to allow a CDT to pinpoint crash location on a map and import various location data fields into the CDS, this does not involve importing geospatial data. Therefore, a separate process must be taken before the final data is released for a given coding year to incorporate geospatial data. In the past extensive and time-consuming efforts were undertaken to validate the added geospatial data, though these efforts have been scaled back in recent coding years. While this has reduced the amount of time needed to release final data by approximately 30 days, it is still an extra process that would be unnecessary if the data were geospatially enabled at the source.

3.1.4 Data Reports, Requests and Reporting Tools

Through a review of the CAR Unit crash data request fulfillment process, various reports and reporting processes for the state file fatal crash data, FARS and Motor Carrier crash data, as well as interviews with unit staff and data partners both internal and external to ODOT, several key challenges have been identified and are summarized below.

3.1.4.1 Difficulty Creating and Maintaining Queries and Report Formats

The CAR Unit maintains hundreds of SQL queries to facilitate crash data reporting which are run in a module within the CDS and stored both in the CDS and in a separate network storage location. Additional report queries are created on an as-needed basis by the Crash Data Reporting Technician (CDRT) and the Crash Data Analysts (CDA), resulting in a heavy reliance on the institutional knowledge and technical capabilities of a few select staff. Most queries are created or updated using the built-in query builder tool. This tool is very limited, as it relies on a simple interface to construct the query and does not allow a user to freely type their own query statements. In addition, the interface that displays the constructed query is not responsive to varying screen sizes and resolutions, and lacks line numbers, color-coding, and the ability to add comments, which are standard in other query building programs. When developing complex queries, it is common for the CDAs to run into errors. The CDS module does not give adequate feedback on the root cause of the error, so the code must be copied and pasted into a separate query building program, such as SQL Server Management Studio (SSMS), in order to more easily identify the error. For particularly complex queries, the CDAs must develop their query in SSMS and utilize other report building methods outside of the CDS.

Similarly, report formats used for standard reporting, raw data extracts, and publications are created and stored in a CDS reporting module which utilizes the Crystal Reports application. However, report format creation process is complex and requires working directly with a developer familiar with the system. There is no staff member currently available to assist with this, so there is a growing list of report formats the CDAs need created, updated, or fixed that are going unaddressed, including at least one major publication in need of re-development. If a simple report format is needed to respond to common data requests, the CDAs may create custom reports and artifacts using various programs outside of the CDS. This can be difficult depending on the workload of the Analysts who are responding to complex data requests daily.

3.1.4.2 Excessive Time Devoted to Quick Turnaround Requests

Many of the data requests the CDRT and CDAs receive are high-profile requests from media sources received through the Project Information Officers (PIOs) or the Communications Section. These requests require a quick turnaround and as a result, staff often need to put other work on hold to address and fulfil the request. While many requests could be fulfilled by the requestor themselves, they find our data tools difficult to use and instead direct their requests directly to the CAR Unit.

3.1.4.3 Difficulties in Manual Report Maintenance and Distribution Outside of the CDS

Staff who maintain data outside of the CDS also face difficulties around the manual maintenance and distribution of data reports. The ODOT Initial Fatal Information List spreadsheet maintained by the FDT requires daily manual updates to enter the latest fatal crash information. Annually, the FDT must also manually update the spreadsheet to remove the previous year's data. This report must also be distributed to several email lists daily. Due to the limitations of the database format, Microsoft Access developer support, and a lack of staff familiarity with query creation and maintenance, options for automation have been limited.

Similarly, there are various monthly reports that the FARS Analyst creates and distributes, though the distribution cadence has been irregular and has also not been automated. The MCCA also creates and distributes a variety of monthly reports but utilizes an Access database populated with data exported from SAFETYNET to generate reports, which further complicates the process by the additional work needed to maintain the Access database.

3.1.4.4 Issues with Perceived Fatal Crash Data Inconsistency

Fatal data is tracked in the Fatality Tracker by the FDT, entered into the CDS by the CDTs, tracked and entered into the Oregon FARS Tracking System and RBIS by the FARS Analyst, and entered into SAFETYNET by the MCCA. These different systems require varying coding procedures, data definitions, and level of detail. While data is shared among all staff during the collection process, and reconciliation efforts are taken, this can result in perceived inconsistency most notably for final data counts, requiring staff to be able to explain or justify the inconsistencies.

3.1.4.5 Difficulties Using the Crash Data Tools Available

Through interviews with CAR Unit staff, as well as surveys and interviews with data partners both internal and external to ODOT, several issues with our supported crash data tools were reported. ODOT currently supports multiple tools that either provide, manipulate, or present crash data, with several tools providing redundant functionality. While this can be a strength in that users are able to find a tool that is well-suited for a particular need, one of the major issues reported by internal and external partners was the lack of a true one-stop-shop tool for crash data. This necessitates that some users interact with multiple crash tools to accomplish their work. In addition, many of the tools provided, in particular the TransViewer portal, are not intuitive for users and many data formats require extensive background knowledge, post-processing and technical capabilities to utilize. There is also a general lack of training and resources to teach users how to utilize these systems. Users with limited capabilities are unable to easily obtain the data or answers they need through the current self-service tools. This results in increased data requests submitted to the CAR Unit, and thus an increase in staff workload.

3.1.4.6 Lack of Integration between Crash Data and Other Data Sources

Through surveys and interviews with various crash data users internal and external to ODOT, a common issue mentioned was the complete lack of integration between crash data and other data sources such as Emergency Medical Services (EMS) and hospital/emergency department data, vehicle and driver records, demographic and socioeconomic data, citation and adjudication data, and Vehicle Miles Travelled (VMT) data. The lack of integration makes it difficult for data users to get a more complete understanding of the impact of crashes in Oregon and allow for more accurate safety analysis, and project planning and investment.

3.2 Description and Prioritization of Desired Changes

Through an in-depth review of all processes related to crash data, as well as interviews with key unit staff and data partners internal and external to ODOT, various desired changes have been identified and are described in this section as user needs. A user need describes a required capability of a system, expressed in general terms that are not solution-oriented and captures the rationale or intent as to why the capability is needed. The user needs defined here will drive future system requirements and validate the system design after deployment.

3.2.1 User Needs Breakdown

In this section, the user needs are categorized by the two operational scenarios being considered. Operational Scenario A involves a higher level of automation in transferring data from DMV system components to the new system replacing the CDS as well as more automation in the creation of Crash Data records, while Operational Scenario B involves a more manual transfer and Crash Data record creation processes similar to the current workflow. The user needs are divided into three lists – a common list of needs irrespective of operational scenario, and two lists of scenario-specific needs.

User needs are uniquely identified by indicating the operational scenario, general process step, user group, a sequential need statement number, and a sequential child statement number (if applicable). User needs are indicated as child statements if they expand the scope of a previously defined need. The assigned need IDs are prefixed with "UN" (denoting "User Need") and include the following abbreviations:

- Operational scenario:
    - C – Common to both operational scenarios
    - A – Related to Operational Scenario A
    - B – Related to Operational Scenario B
- General process step:
    - DC – Data Collection
    - DP – Data Processing
    - DQ – Data Quality Assurance/Quality Control
    - DD – Data Distribution and Reporting
    - O – Other
- User group:
    - CIT – Citizens/drivers
    - LE – Law enforcement
    - CRU – Crash Reporting Unit (within DMV)
    - CAR – Crash Analysis and Reporting Unit
    - DU – Data users

In addition, each user need is assigned a priority level. The priority levels and justifications are as follows.

- **Essential needs** shall be provided by the new system. These needs meet the following criteria: they are critical to the success of the project goal which is to improve the timeliness of crash data being made available to the public and develop a system that is scalable and able to adapt to future business needs.
- **Desirable needs** should be provided by the new system. These needs meet the following criteria: they are very important but not critical to the success of the project goal.
- **Optional needs** might be provided by the new system. These needs meet the following criteria: they are important but not critical to the success of the project goal or may not be feasible to accomplish given various constraints.

3.2.1.1 Common User Needs List

Need ID	Need Statement	Priority
UN-C-DC-CIT-01	**Easy crash report submission (CIT).** Citizens/drivers need to be able to fill out and submit their crash reports electronically, in order to simplify	Essential

	the process by eliminating the need to print, sign, and scan/email or physically mail the report. *Please note: This need shall be addressed through the work of the DMV E-Crash Report project, in which an online application that will allow citizens to submit crash reports is being developed and is expected to launch in August 2023.*	
UN-C-DC-CIT-01-01	**Access to help resources (CIT).** Citizens/drivers need to be able to access help resources easily when filling out a crash report, in order to mitigate confusion on what is needed or required for certain fields.	Desirable
UN-C-DC-LE-01	**Standardized crash report submission.** Law enforcement officers need to be able to fill out and submit their crash reports in a standardized electronic way, in order to increase consistency in report completeness and decrease the amount of time taken to submit a report.	Desirable
UN-C-DC-LE-01-01	**Access to help resources (LE).** Law enforcement officers need to be able to access help resources easily when filling out a crash report, in order to mitigate confusion on what is needed or required for certain fields.	Optional
UN-C-DC-LE-01-02	**Precise geo-location identification.** Law enforcement officers need to be able to manually indicate the precise geo-location of the crash when submitting the crash report, in order to provide accurate geospatial data.	Desirable
UN-C-DC-CRU-01	**Automatic determination of electronic crash report acceptability.** The DMV CRU Crash Report Processors need a way to automatically determine if an electronic crash report is reportable or not under the criteria defined in ORS 811.720, in order to reduce the number of reports being manually reviewed and improve overall timeliness.	Essential
UN-C-DC-CRU-02	**Automatic matching of electronic crash reports.** The DMV CRU Crash Report Processors need a way to automatically match electronic crash reports in order to reduce the number of reports being manually matched and improve overall timeliness.	Essential
UN-C-DC-CRU-03	**Standardized matching of electronic and paper crash reports.** The DMV CRU Crash Report Processors need a standardized way to match electronic and paper crash reports in order to reduce the number of reports being manually matched and improve overall timeliness.	Essential
UN-C-DC-CAR-01	**Fast identification of fatal crashes.** The CAR Unit FDT and FARS Analyst needs to be able to have crashes involving a fatality quickly identified in order to meet federal reporting requirements.	Essential
UN-C-DC-CAR-02	**Fast identification of all federally reportable CMV crashes.** The CAR Unit MCCA needs to be able to have crashes involving any federally reportable CMV quickly identified in order to meet federal reporting requirements. *Please note: This need is partially addressed through short-term process change efforts that have been implemented as of November 2022. Long-term solutions are still in discussion, though this may also be addressed through the DMV E-Crash Report project.*	Essential
UN-C-DC-CAR-03	**Automatic determination of injury severity.** The CAR Unit CDTs need a way to automatically determine the injury severity level of a crash when a crash report is received in order help CDTs prioritize higher severity crashes and improve overall timeliness.	Desirable

UN-C-DC-CAR-04	**Single source for data related to a crash.** The CAR Unit staff need a single Crash Report Case File for all data related to a crash in order to eliminate the creation of additional case files for the same crash event across disparate systems.	Essential
UN-C-DC-CAR-04-01	**Separate incorrectly matched crash reports.** The CAR Unit CDTs need an easy way to split a Crash Report Case File into which crash reports were incorrectly matched, in order to improve the accuracy of crash data coding.	Essential
UN-C-DP-CAR-01	**Easier access to help resources.** The CAR Unit CDTs need to be able to easily access help resources in a way that does not require searching through a large system code manual or relying on institutional knowledge in order to improve the timeliness of the coding process.	Essential
UN-C-DP-CAR-02	**Responsive application views.** All system users need the system's data entry view to respond to varying screen sizes and resolutions in order to improve visual coherence and ease-of-use.	Essential
UN-C-DP-CAR-03	**Role-based permissions.** Relevant CAR Unit staff need to be able to control permissions to various modules within the envisioned system based on application roles in order to prevent issues with the data or misuse of the system.	Essential
UN-C-DP-CAR-04	**Manual data entry and editing.** CAR Unit CDTs need to be able to manually enter crash data records in order to enter and edit data field values as necessary.	Essential
UN-C-DP-CAR-04-01	**Responsive data entry and editing.** CAR Unit CDTs need to be able to promptly enter and edit data without experiencing sluggishness or glitches in the system in order to improve the timeliness of the coding process.	Essential
UN-C-DP-CAR-04-02	**Option to import data from other sources.** The CAR Unit CDTs, FDT, FARS Analyst, and MCCA need to be able to import data into the envisioned system from other sources, such as PDFs, to prevent additional manual data entry in the case the system goes down or the coding of particular crash types is outsourced.	Essential
UN-C-DP-CAR-05	**Direct geospatial data integration.** Relevant CAR Unit staff need to be able to accurately locate a crash in a geospatially enabled system and import location data in order to include such data at the source and eliminate the need for additional third-party processes.	Essential
UN-C-DP-CAR-05-01	**Consistent and up-to-date roadway network data integration.** CAR Unit CDTs need to be able to have access to consistent and up-to-date roadway network data across all modules of the system in order to simplify the process of locating a crash and increase accuracy of the location data.	Essential
UN-C-DP-CAR-05-02	**Maintainable streets database.** In the event that UN-C-DP-CAR-05-01 cannot be met, relevant CAR Unit staff need to be able to maintain a database (internal to the system) of all streets in order to increase accuracy of the location data.	Essential[1]
UN-C-DP-CAR-06	**Accurate data validation rules.** CAR Unit CDTs need to be able to rely on accurate data validation rules within the system in order to reduce the amount of time required to correct validation errors and the need for additional unnecessary QA/QC procedures.	Essential

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[1] Need is deemed essential if UN-C-DP-CAR-05-01 is unmet, otherwise is deemed optional.

UN-C-DP-CAR-06-01	**Maintainable data validation rules.** CAR Unit CDAs need to be able to add, update, or remove data validation rules used by the system in order to adapt to changing business needs.	Essential
UN-C-DP-CAR-06-02	**Timely data validation.** Relevant CAR Unit staff need to be able to validate data quickly in order to improve the timeliness of the coding process.	Essential
UN-C-DP-CAR-07	**Ability to save crash records throughout the coding process.** CAR Unit CDTs need to be able to save a crash record at any time during the coding process in order to be able to continue the process at a later time without having to run through the full data validation process.	Essential
UN-C-DP-CAR-08	**Track fatal and CMV crash records within the overall system.** The CAR Unit FDT, FARS Analyst, and MCCA need to be able to track fatal or CMV crash records within the envisioned system in order to automatically capture any data changes from the CDTs, eliminate the data security issues with the current tracking method, and improve the timeliness of required federal reporting.	Essential
UN-C-DP-CAR-08-01	**Enter initial fatal and CMV crash records.** The CAR Unit FDT, FARS Analyst, and MCCA need to be able to create initial fatal or CMV crash records and enter them into the system in order to have record of the fatal or CMV crash occurrence when an official report from law enforcement has not yet been received.	Essential
UN-C-DQ-CAR-01	**Validate and approve crash records prior to release.** The CAR Unit CDT Team Lead (and potentially others) needs to be able to access the crash records entered by the CDTs, automatically run timely validation and QA/QC procedures, correct any errors if necessary, and approve them in order to have additional oversight prior to finalizing the data for public release.	Essential
UN-C-DQ-CAR-02	**Automatic comparison and reconciliation of in fatal crash data.** The CAR Unit CDT Team Lead, FARS Analyst, and MCCA (for fatal CMV crashes) need to be able to automatically compare and reconcile differences in fatal crash data between the data CDTs, FARS Analyst, and MCCA captures in order to quickly and regularly identify and correct or accept differences and improve timeliness of required fatal data reporting.	Essential
UN-C-DD-CAR-01	**Efficient data query creation and maintenance.** The CAR Unit CRT and CDAs need to be able to efficiently create, maintain, and store queries within the envisioned system to aid in data report creation in order to quickly respond to data requests and alleviate the issues experienced with the query builder in the current system.	Essential
UN-C-DD-CAR-01-01	**Direct query statement entry.** The CAR Unit CDAs need to be able to type out query statements directly into the proposed system in order to create more complex queries in order to quickly respond to complex data requests and alleviate the issues experienced with the query builder in the current system.	Essential
UN-C-DD-CAR-01-02	**Query statement error identification.** The CAR Unit CRT and CDAs need to be able to quickly identify the source of an error in the query statements they create without having to utilize third-party tools external to the system in order to quickly respond to data requests.	Essential

UN-C-DD-CAR-01-03	**Query statement controls.** The CAR Unit CRT and CDAs need to be able to construct/enter query statements with limitations on what kinds of statements are allowed in order to protect the integrity of the data.	Essential
UN-C-DD-CAR-01-04	**See query results in a variety of formats.** The CAR Unit CDRT and CDAs need to be able to view query results in a variety of formats including raw data, on a map, and used in conjunction with a crash data report in order to fulfill data requests.	Essential
UN-C-DD-CAR-02	**Efficient data report template creation and maintenance.** The CAR Unit CDAs need to be able to efficiently create and maintain report templates without having to rely on staff external to the unit or third-party tools external to the system in order to quickly respond to data requests and ensure the production of useful and usable data products.	Essential
UN-C-DD-CAR-03	**Compute values for major data products.** The CAR Unit CDAs need to be able to compute the values for use in various major data products, such as the Crash Rate Book, in order to avoid a large manual effort and maintain the timeliness of the dissemination of various data products.	Essential
UN-C-DD-CAR-04	**Automated report generation for state file data.** The CAR Unit CDAs need to be able to set up automated report generation in order to eliminate the need to manually generate various final data products and thus disseminate them faster. *Please note: This need shall be addressed through the work of an ongoing project in collaboration with ODOT's Business Intelligence/Data Warehouse (BIDW) section to automate report generation through SQL Server Reporting Services (SSRS). The envisioned system must maintain compatibility with reporting through SSRS.*	Essential
UN-C-DD-CAR-04-01	**Automated report generation for fatality tracking data.** The CAR Unit FDT needs to be able to set up automated report generation in order to have a consistent cadence in the generation and distribution of various regular reports.	Essential
UN-C-DD-CAR-04-02	**Automated report generation for FARS tracking data.** The CAR Unit FARS Analyst needs to be able to set up automated report generation in order to have a consistent cadence in the generation and distribution of various regular reports.	Desirable
UN-C-DD-CAR-04-03	**Automated report generation for SAFETYNET data.** The CAR Unit MCCA needs to be able to set up automated report generation in order to have a consistent cadence in the generation and distribution of various regular reports.	Desirable
UN-C-DD-CAR-05	**Manage crash data requests.** The CAR Unit CDRT and CDAs need to easily manage and fulfill crash data requests in order improve request turnaround time.	Essential
UN-C-DD-CAR-06	**Publish data fatal and CMV reporting data to other systems.** The CAR Unit FARS Analyst and MCCA need to be able to publish data entered into the envisioned system to the federal data reporting systems (RBIS and MCMIS, respectively) in order to reduce the need for additional manual steps and meet federal reporting benchmarks or requirements.	Desirable
UN-C-DD-DU-01	**Intuitive tool to access crash data.** Crash data users need to be able to access crash data through an intuitive self-service tool in order to fulfill their own data requests and reduce the need to rely on CAR Unit staff to provide the requested data.	Essential

UN-C-DD-DU-01-01	**Data tool help resource availability.** Crash data users need to be able to have access to help resources directly within the data tool that provide information on how to use the tool as well as any background knowledge necessary to interpret the data in order to use the effectively and mitigate the risk of misinterpreting the data.	Essential
UN-C-DD-DU-01-02	**Variety of data formats.** Crash data users need to be able to obtain their data in a variety of formats from simple summaries to raw data files in order to meet their individual work needs.	Essential
UN-C-DD-DU-01-03	**One-stop-shop for crash data.** Crash data users need to be able to have access to a single tool that suits all of their needs instead of having to utilize several disparate tools in order to complete their work in a more efficient and timely manner.	Desirable
UN-C-DD-DU-01-04	**Submit a crash data request.** Crash data users need to be able to submit a crash data request using a guided form in order to better inform users of the available data fields and formats and reduce the amount of back-and-forth communication to clarify user needs.	Essential
UN-C-DD-DU-02	**Integrating with other data sources.** Crash data users need to be able to easily integrate crash data with relevant data from other sources (e.g., EMS data, vehicle and driver records, etc.) in order to get a more complete understanding of the impact of crashes in Oregon to aid in their individual work.	Essential
UN-C-O-CAR-01	**Efficient CDT training.** The CAR Unit CDTs need to be able to be efficiently trained on all coding practices in order to be brought up-to-speed in a timelier manner.	Essential
UN-C-O-CAR-02	**Perform system management.** Relevant CAR Unit staff need to be able to perform various system management tasks, such as distributing updated description values to various database tables, maintaining reference tables, computing 3-year average crash statistics values, importing annual road and route segment values, and purging report/query usage statistics in order to reduce the reliance on ISB for business tasks.	Essential
UN-C-O-CAR-02	**Automated notifications of new crash report availability.** Relevant CAR Unit staff will need to be able to be automatically notified by the system when new crash reports are available in order to improve the timeliness of the coding process.	Essential
UN-C-O-CAR-02-01	**Customization of automated notifications.** Relevant CAR Unit staff will need to be able to customize the notifications they wish to receive to tailor them to their individual work needs (e.g., receiving notification of all reports for a given county, or receiving notification of only reports involving fatalities) in order to improve the timeliness of the coding process and avoid notifications that do not pertain to their work.	Essential
UN-C-O-CAR-03	**Automated list of records missing official crash reports and/or key data.** Relevant CAR Unit staff need to be able to receive a list of records missing official fatal crash reports from law enforcement and/or key data values, such as blood alcohol content values, at a regular cadence designated by staff in order to make necessary requests for reports in a timely manner.	Desirable
UN-C-O-CAR-04	**Track CDT coding performance.** The CAR Unit manager, CDT Team Lead, and CDTs need to be able to track CDT coding performance for any	Essential

	given period of time (day, week, etc.) for unit-internal tracking purposes.	
UN-C-O-CAR-04-01	**Data metric availability for crash records and reports.** Relevant CAR Unit staff and management will need to be able to view data metrics for coded crashes (e.g., number of crashes records coded compared to reports received for a given severity level) in order to determine and evaluate Unit performance measures.	Essential

3.2.1.2 Specific User Needs for Operational Scenario A

Need ID	Need Statement	Priority
UN-A-DC-CRU-01	**Processing for paper crash reports.** The DMV CRU will need to retain a process for handling paper crash reports in order to capture report data from users unable to utilize the electronic submittal method. *Please note: This need shall be addressed through the process changes included in the DMV E-Crash Report project which is expected to launch in August 2023.*	Essential
UN-A-DP-CAR-01	**Direct access to submitted crash report data.** Relevant CAR Unit staff need to be able to directly access and/or import the submitted crash report data (from previously described needs, UN-C-DC-CIT-01 and UN-C-DC-LE-01), in order to greatly reduce the need to rely on imaged crash reports for coding and alleviate the current difficulties in accessing crash reports, thus improving the timeliness of the coding process. *Please note: This need should be partially addressed through the work of the DMV E-Crash Report project, which is expected to launch in August 2023.*	Essential
UN-A-DP-CAR-01-01	**Accurate vehicle/participant matching.** The CAR Unit CDTs need to be able to have the imported crash report data accurately match the crash participants to their respective vehicles in order to reduce the amount of manual data entry and/or correction and improve the timeliness of the coding process.	Essential
UN-A-DP-CAR-01-02	**Alternate crash report access options.** The CAR Unit CDTs need to be able to access the crash report data through an alternative means in the event the envisioned system goes down in order to prevent a decrease in coding productivity.	Essential

3.2.1.3 Specific User Needs for Operational Scenario B

Need ID	Need Statement	Priority
UN-B-DC-CRU-01	**Automated PDF crash report generation.** Relevant CRU staff need to be able to use the data captured from the electronic crash submittal method (from previously described needs, UN-C-DC-CIT-01 and UN-C-DC-LE-01) and automate the generation of PDF crash reports for CAR Unit use in order to greatly reduce the need to manually create imaged reports for CAR Unit use. *Please note: This need shall be addressed through the work of the DMV E-Crash Report project, which is expected to launch in August 2023.*	Essential

UN-B-DP-CAR-01	**Timely access to generated PDF crash reports.** Relevant CAR Unit staff need to be able to access the crash reports generated using submitted report data (from previously described needs, UN-B-DC-CRU-01), in order to alleviate the current difficulties in accessing and interpreting crash reports and improve the timeliness of the coding process. *Please note: This need shall be addressed through the work of the DMV E-Crash Report project, which is expected to launch in August 2023.*	Essential
UN-B-DP-CAR-01-01	**Access generated PDF crash reports from FileNet.** Relevant CAR Unit staff need to be able to access the generated crash reports directly from the FileNet system, with all necessary metadata needed to query files, in order to reduce unnecessary file duplication.	Desirable

3.3 Changes Considered but Not Included

The majority of the desired changes identified by data partners both internal and external to ODOT were included in user needs. Several changes however were determined to be out of scope of the project and not included as user needs at this time, though we hope to consider them in the future. These changes include:

- The ability to receive data directly from a Connected Autonomous Vehicle (CAV) in the event of a crash.
- The ability to collect and process reports and provide data for other crash events such as near-misses and crashes events not involving a motor vehicle, such as a pedestrian/cyclist event.

3.4 Assumptions and Constraints

When defining user needs, most assumptions made, and constraints identified were found to relate to both operational scenarios while a few only relate to a specific scenario.

3.4.1 Common Assumptions and Constraints

3.4.1.1 Assumptions

- There are available resources, the ability to augment workload of available resources as necessary, or the ability to bring in the resources needed to perform the management, planning, analysis, development, testing, etc. of the overall project to replace the system.
- There exists a commercial off-the-shelf (COTS) system or the ability to develop a system that meets the defined user needs, including geospatial data integration.
- Existing relevant CAR Unit staff will have the availability in their workload to develop the revised help resources necessary to incorporate into the envisioned systems (both for Data collection and input) and any data tools revised or developed, and/or positions will be backfilled to ensure these tasks can be completed.
- Long-term solutions to the issue of quickly identifying crash reports involving small CMVs, such as Motor Carrier funding a second MCCA resource to help with report sorting and coding or retiring the state CMV crash form and relying solely on police crash reports, will be determined and implemented in the near future.
- There exists roadway network data that the envisioned system would be able to connect to and utilize that will meet business needs.
- Existing relevant CAR Unit staff will have the availability in their workload to assess and help determine validation rules necessary for the envisioned system, and/or positions will be backfilled to ensure these tasks can be completed.

- Federally owned systems such as FARS Tracking or SAFETYNET will be able to be integrated with or connected to the envisioned system.
- Federally owned systems such as RBIS and MCMIS will be able to receive data published from the envisioned system.
- Existing relevant CAR Unit staff will have the skills necessary and the availability in their workload to learn how to create and maintain report templates in the envisioned system, and/or positions will be backfilled to ensure these tasks can be completed.
- There is the ability to integrate, interface, or otherwise connect to data sources owned by ODOT such as driver and vehicle records and VMT data.
- There is the ability to integrate, interface, or otherwise connect to data sources not owned by ODOT such as EMS data.
- Any system for entering and maintaining crash data should abide by the latest edition of the national Model Minimum Uniform Crash Criteria (MMUCC) standards, and/or any other relevant standards as required by the business.

3.4.1.2 Constraints

- Any system developed shall abide by agency IT policies.
- All relevant CAR Unit staff will need to be trained on all new systems and/or processes.

3.4.2 Assumptions and Constraints Related to Operational Scenario A

3.4.2.1 Assumptions

- Existing relevant CAR Unit staff will have the availability in their workload to participate in the additional training needed regarding the overall shift of work focus.
- The DMV E-Crash Report project will capture all data fields, not just those relevant to DMV needs, in a database that will be accessible from the envisioned system.
- There will remain a process to capture data from paper forms submitted by citizens/drivers unable to utilize the electronic system.
- There will be the ability to develop a notification system within the system that meets the individual user needs of various CAR Unit staff.
- There will be the ability to determine data metrics for coded crashes and received report data.

3.4.3 Assumptions and Constraints Related to Operational Scenario B

3.4.3.1 Assumptions

- The PDF crash reports generated from data received from the online application that will launch as part of the DMV E-Crash Report project will contain all data necessary for the coding process and be of sufficient quality and resolution to mitigate the issues CDTs experience with FileNet.
- The DMV FileNet system will contain all of the additional metadata and file naming conventions necessary for CDTs to query as needed.

4 Concepts for the Proposed System

4.1 Background and Scope

As discussed in the previous section the processes and systems for collecting, processing, performing quality assurance/quality control (QA/QC), and distributing crash data currently in use at ODOT make it difficult for citizens and law enforcement to submit crash reports, over-complicate the coding process, and overall, negatively impact the timeliness of the data being made available to the data users and partners. The lack of user-friendly self-service tools to obtain crash data contributes to the over-burdening of already limited staff resources. The current systems barely meet current business needs and have no capability to address future needs. The proposed system will mitigate these difficulties and limitations.

The key goals for the proposed system are as follows:

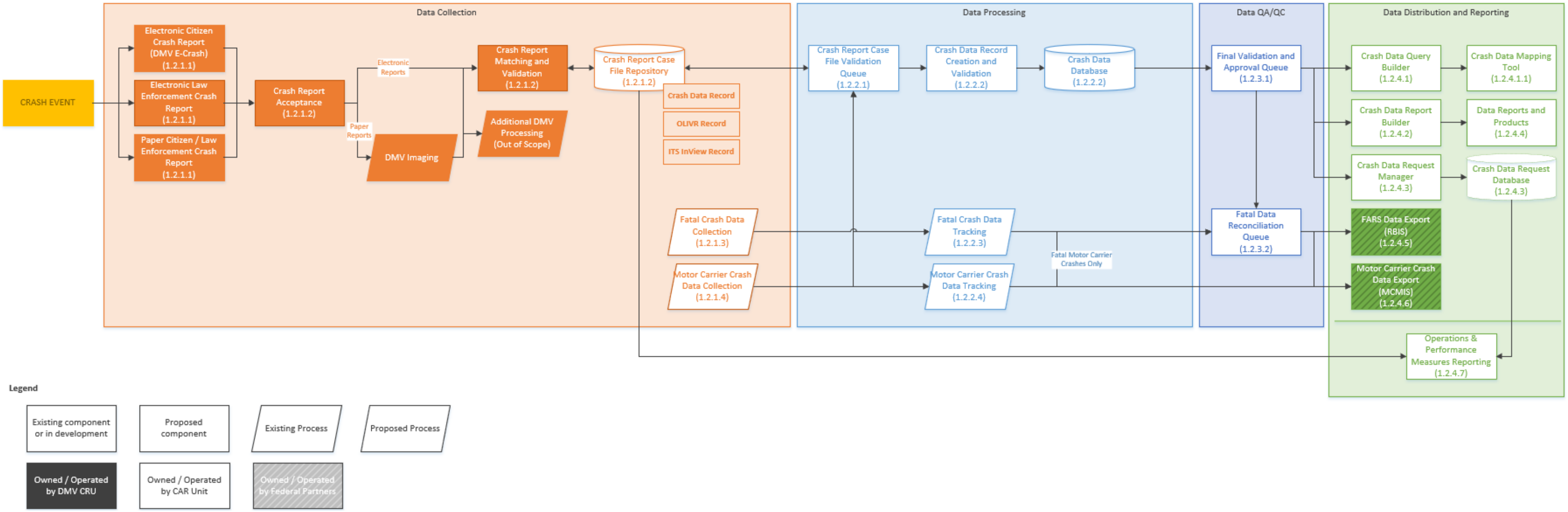
- Provide a straight-forward, standardized, and efficient way for citizens and law enforcement to submit electronic crash reports.
- Provide a more timely and efficient way for the collected crash reports and associated data to be made available to Crash Analysis and Reporting (CAR) Unit staff for processing.
- Provide a modern, useful, and usable system for crash data coding, tracking, and reporting.
- Provide a system that is easy to maintain, revise, and expand upon based on future business needs.
- Provide a system that is easier to learn and maintain than the current system.
- Provide a useful and usable tool, or set of tools, for users and customers to obtain crash data in a manner that suites their business needs.
- Improve the overall timeliness of crash data being released to data partners.

In addition, there are two main operational scenarios being considered that will dictate several key functions of the proposed system. In the following sub-section, the commonalities as well as differences in the required functionality between the two operational scenarios is discussed in further detail.

4.2 Description of the Proposed System

At a high level the proposed system is a "system of systems" consisting of new components integrated into existing systems and a new system to replace the existing Crash Data System (CDS). This new system is envisioned to not only replace the CDS, but to expand on functionality and replace other existing disparate systems by including fatal crash and motor carrier crash data tracking. The new system and components can be organized into the following general functional areas: data collection, data processing, data QA/QC, and data distribution and reporting. Envisioned ownership and operation responsibilities of each new component or system are discussed further in this section. The overall proposed system will require a high-level of interoperability and must be designed to mitigate issues that may arise if one or more systems or components are temporarily unavailable. See 4.5 Modes of Operation for the Proposed System for more information. The following figure shows a high-level overview of the basic data flows between the various systems and components that are envisioned for the overall proposed system's operating environment. The figure is organized by the three general functions and indicates the user group responsible for ownership and operation for each system and component.

Figure 4-1 – Proposed System Context Diagram



4.2.1 Data Collection

4.2.1.1 Crash Report Collection

New components within the proposed system allow for major improvements in the crash report collection process. One of these new components provides citizens the option to submit their crash report electronically, mitigating the difficulties experienced with the current paper submittal method. This new component is designed to be user-friendly and straightforward and provides help resources for data fields that have been historically difficult for users to fill out. The implementation of this component is expected to reduce the amount of paper reports needing to be sorted and imaged by the Driver and Motor Vehicle Services (DMV) Crash Reporting Unit (CRU) over time. This component is currently under development as part of the DMV E-Crash Report project and will be incorporated into the existing DMV2U system with an expected launch in August 2023. Ideally this tool would also allow citizens to submit geospatial crash location data, but this functionality is not planned for the DMV E-Crash Report project.

Another new component would provide the ability for law enforcement officers to also submit crash reports electronically. This may be a single standardized method for all law enforcement agencies to adopt, or a collection of multiple methods to fit different agencies' needs. Further analysis is needed to determine which would be the most effective approach. Regardless, this would allow for the submittal of all information currently being collected through paper reports, as well as the ability to submit geospatially enabled crash location data. This component is not included in the DMV E-Crash Report project, and there are no other related development projects currently underway. Further analysis is needed to determine if this component could be integrated into the exiting DMV2U system. This overall effort will likely require legislative action to be truly effective.

Paper crash reports will continue to be submitted by both citizens and law enforcement, though the number of paper crash reports is expected to decrease once the electronic submittal methods are fully implemented and adopted.

The new components for electronically receiving crash reports from citizens and law enforcement are expected to be owned and operated by the DMV CRU.

4.2.1.2 Crash Report Acceptance, Matching, and Case File Creation

Once a crash report is received, it must undergo an acceptance process to ensure the crash is reportable by the standards defined in Oregon Revised Statute (ORS) 811.720. For electronically submitted reports, this process is automated to the extent possible through a new Crash Report Acceptance component. Further analysis will be required to determine precise acceptance criteria, and manual review may still be required for certain electronically submitted reports. For paper reports, DMV CRU staff must manually review the report to determine acceptance. This new component may be able to be integrated into DMV's existing Oregon License Issuance and Vehicle Registration (OLIVR) system. Crash reports would be flagged either automatically (for most or all electronic reports) or manually (for paper reports) as reportable or non-reportable. Automatically processed reports would then be sent to a new Crash Report Matching component, with non-reportable reports going into the Non-Reportable Queue within the component, while manually processed reports are sent to the DMV CRU Imaging Team for scanning and image generation.

Electronically submitted reports that have been processed through the Crash Report Acceptance component are automatically sent to a new Crash Report Matching component. If the submitted crash report was flagged as non-reportable, it will be added to the Non-Reportable Queue within the component. If the submitted crash report was flagged as reportable, this component will compare the submitted crash report data to data in a new Crash Report Case File Repository database and to the reports in the Non-Reportable Queue. If Operational Scenario A is chosen to be implemented, and a matching report is found in the Case File Repository, the corresponding existing Crash Report Case File record will be updated to include the raw data from the report. If a matching report is found in the non-reportable queue, a new Case File record will be created and the raw data from both the new report and matching report will be added to the new Case File record, and the non-reportable report will be removed from the queue. If a matching report is not found, a new Crash Report Case File record will be created, the raw data will be added to the record, and a new DMV Serial Number will be automatically generated and assigned. If Operational Scenario B is chosen to be implemented, the overall process remains the same but instead of the raw data being included in the Crash Report Case File record, a PDF is generated using the raw data and attached to the record. The details of this process have yet to be determined but may involve a reference such as a URL to the PDF location in FileNet being added to the record. Regardless of Operational Scenario, any report indicating a fatality, or the involvement of a federally reportable Commercial Motor Vehicle (CMV) and any report submitted by law enforcement will result in corresponding flags or indicators being set in the record. In the case of CMV involvement, the criteria used by the component to determine if it is federally reportable will be determined by the CAR Unit. Further analysis will be required to determine all matching criteria. In addition, the new component may review all relevant data to determine and assign an initial injury severity level – further analysis is needed to determine if this is possible and beneficial. The new component will also gather and enter additional data fields, such as Oregon Driver License number and Vehicle Identification Number, from the corresponding driver and vehicle records for the drivers and vehicles indicated in the report into the Case File record. The records are then immediately available for the CAR Unit for further processing, discussed further in 4.2.2 Data Processing. While the submitted report is undergoing the automatic crash report matching process it is simultaneously made available for other DMV processes, such as verifying insurance and issuing sanctions, which are out of scope for the overall proposed system. This new component may be able to be integrated into the OLIVR system.

Any paper reports submitted by citizens or law enforcement will undergo the current DMV CRU imaging process to scan and create electronic image files that are combined into a single PDF. These PDFs are then matched manually through the new Crash Report Matching component by DMV CRU Crash Report Processors. Crash reports involving fatalities or CMVs should be prioritized during imaging and manual matching. If a matching report is found, the new crash report is attached to the corresponding Crash Report Case File record. The details of this process have yet to be determined but may involve a reference such as a URL to the PDF location in FileNet being added to the record. If no matching report is found, the user manually creates a new Crash Report Case File record, attaches the crash report, and manually triggers the generation and assignment of a new DMV Serial Number. Due to an existing backlog of paper reports requiring processing, this manual matching process may need to occur prior to imaging so flexibility in the workflow of the overall proposed system will be necessary. Similar to the automatic matching method, the DMV CRU Crash Report Processor would be required to set related flags or indicators if the report indicated a fatality or the involvement of a CMV or was submitted by law enforcement. In addition, the Crash Report Processor may also need to manually determine and assign the injury severity level for the crash. Further analysis will be needed to determine if DMV CRU staff will have the resource capacity to take on this additional responsibility. The Crash Report Processor will also gather and enter additional data fields, such as Oregon Driver License number and Vehicle Identification Number, from the corresponding driver and vehicle records for the drivers and vehicles indicated in the report into the Case File record. If possible, the Crash Report Matching component may utilize optical character recognition to be able to automatically match paper reports as well – further analysis will be needed to determine if this is not only possible, but if it is an effective approach given the number of reports that are filled out by hand.

Once the paper report has been imaged, it is available for the other out-of-scope DMV processes previously mentioned.

The Crash Report Acceptance and Crash Report Matching component is expected to be owned and operated by the DMV CRU, while the ownership and operation of the Crash Report Case File Repository database is expected to be owned and operated by the CAR Unit.

4.2.1.3 Fatal Crash Data Collection

The processes that the CAR Unit's Fatal Data Technician (FDT) and the Fatality Analysis Reporting System (FARS) Analyst use to collect fatal data are further integrated within the new system. Once a Crash Report Case File record indicating a fatality is created or updated, the FDT and FARS Analyst are automatically sent notifications by the new system. The FDT may also become aware of new fatal crash events prior to the law enforcement agency submitting a crash report through a variety of external data sources. In this case, the FDT will manually create a Crash Report Case File record and include all relevant data. Upon record creation, a notification will be automatically sent to the FARS Analyst for additional processing.

Both the FDT and FARS Analyst retrieves and receives data from a variety of sources related to a fatal crash, such as death certificates, blood alcohol content (BAC) and toxicology reports, driver and vehicle records, and EMS records. While the processes for retrieving and receiving other report types remain largely unchanged from the current system, these documents are manually attached to the corresponding Crash Report Case File record. See 4.2.2.3 Fatal Crash Data Tracking for more information.

Note that the FDT position, processes, and responsibilities are currently being evaluated for revision in 2023, so some of the responsibilities listed here may be subject to change.

4.2.1.4 Motor Carrier Crash Data Collection

Within the proposed system, once a Crash Report Case File record indicating the involvement of a federally reportable CMV is created or updated, the Motor Carrier Crash Analyst (MCCA) is automatically sent a notification by the new system. The MCCA may also receive a crash report directly from law enforcement, or Motor Carrier Crash Report forms from DMV or Motor Carriers directly via fax, mail, and email. The system will also regularly access the Trucking Online Motor Carrier Online Reporting Database and notify the MCCA of new reports. In these cases, the MCCA will review records in the Crash Report Case File Repository to determine if a matching record has already been created. If so, the MCCA updates the corresponding Crash Report Case File record to include necessary data or creates a new record and attaches the received report. If the newly created record indicates a fatality, a notification will be automatically sent to the FDT and FARS Analyst for further processing. From there, the MCCA can proceed with further analysis and data entry. See 4.2.2.4 Motor Carrier Crash Data Tracking for more information.

4.2.2 Data Processing

4.2.2.1 Crash Report Case File Validation Queue

Upon the creation or update of a Crash Report Case File record, the record will automatically be displayed in the Crash Report Case File Validation Queue within the new system. From the Validation Queue, Crash Data Technicians (CDTs) will be able to see a full list of all of the Crash Report Case File records with indicators showing how ready a record is to be coded into a Crash Data record. For example, a record may be fully ready to code once a crash report has been received from law enforcement even if no other reports have been matched to it. This would address one of the recommendations from the Equitable Active Safety Improvements Evaluation (EASIE) project, though further analysis is needed to determine all readiness criteria. From the overall list of records, a CDT will be able to sort and query by various fields such as county, injury severity level, and more, retaining the sort and query capabilities currently used in the FileNet system. The CDT will also be able to review and confirm or update the injury severity level that may have been previously automatically assigned, as well as review the crash report data within the record and manually assign an injury severity level.

If Operational Scenario A is chosen to be implemented, the CDT can also either open and view the raw crash report data from a Crash Report Case File record directly or open the crash report PDF file(s) for paper reports. The CDT can then import various data fields directly from the Crash Report Case File record into a new Crash Data record and begin the coding process. If Operational Scenario B is chosen to be implemented, the CDT would open the crash report PDF file(s) for all Crash Report Case File records, regardless of submittal method. In this Operational Scenario the CDT would not have the option to import any data into a Crash Data record. See 4.2.2.2 Crash Data Record Creation and Initial Validation for more information.

Regardless of Operational Scenario, the CDTs will also be able to split a Crash Report Case File record if crash reports were matched mistakenly. In this case, the CDT would use the Crash Report Case File Validation Queue to split the Case File record and modify or assign a new DMV Serial Number. This would then send notification to DMV CRU of the update. Further analysis will be needed to determine whether a new or modified DMV Serial Number should be assigned.

The Validation Queue will also be utilized by the FDT, FARS Analyst, and MCCA to update existing or create new Crash Report Case File records using additional data gathered during the 4.2.1.3 Fatal Crash Data Collection and 4.2.1.4 Motor Carrier Crash Data Collection processes. See 4.2.2.3 Fatal Crash Data Tracking and 4.2.2.4 Motor Carrier Crash Data Tracking for more information.

The Crash Report Case File Validation Queue is a component of the new system and is expected to be owned and operated by the CAR Unit.

4.2.2.2 Crash Data Record Creation and Initial Validation

If Operational Scenario A is chosen to be implemented, a CDT will be able to create a new Crash Data record by directly importing various data fields from the raw crash report data from the Crash Report Case File record for reports submitted electronically. Further analysis will be required to determine which fields can be imported in this way, as some automated coding may be necessary to meet crash data requirements. This includes any geospatial crash location data that may have been submitted by citizens or law enforcement. Once data has been imported, the CDT can then validate and confirm or update an imported crash location or add a new one using a geospatial mapping tool integrated into the new system. From there, the CDT can review the other raw crash report data and code and enter additional data fields as necessary.

If Operational Scenario B is chosen to be implemented, or for any paper reports submitted regardless of Operational Scenario, the CDT will not be able to automatically import data directly into a new Crash Data record. Instead, the CDT will open the crash report PDF file(s) directly from the Validation Queue and review the data to code and enter all data fields as necessary. The CDT will also be able to add a crash location using a geospatial mapping tool integrated into the new system.

When a CDT confirms, updates, or adds a crash location the associated geospatial data will be directly integrated. This eliminates the need for additional external systems or processes to integrate geospatial data into the dataset and helps expedite the data for distribution and reporting. The new system also allows for integration with the most up-to-date Agency roadway network data available which improves the consistency of street name data across various systems maintained by the Transportation Data Section, and other systems throughout the agency.

Regardless of Operational Scenario, the CDTs will have easy and quick access to internal help resources to assist in the coding process. The inclusion of these resources directly within the subsystem is particularly helpful for CDTs to reduce the need to frequently rely on external resources, such as the Traffic Crash Analysis and Coding Manual, street references, milepoint logbooks, and the coder training workbook. In addition, data entry will be prompt and responsive, eliminating the sluggishness and unexpected behavior experienced with the current system. The new system also allows users to create new Crash Data records by importing data from a variety of sources, including fillable PDF files or Microsoft Excel spreadsheets. This will allow for coding work to continue during a system outage and the easy import of that data once the system is restored, or if the coding of particular crash types is outsourced in the future.

Once a Crash Data record has been created and basic data has been coded and entered, the CDT will be able to save the record in two ways. The CDT may save the record as in-progress to continue coding later or run the record through initial validation and save it for final validation. In both cases, the record is saved to the Crash Data Record database with an appropriate status code indicating the level of validation completed. While validation rules in the current system have largely been documented, further analysis will be needed to determine the precise validation rules that the record should be run against in the new system. Geospatial validation of the crash location will also be performed at this time. Upon validating and saving, various error messages may be returned to the CDT requiring review and correction before the record can be saved. Various warnings may also be returned that may be addressed through data review and correction or dismissed. While "warning" and "error" criteria for the current system has been documented, further analysis will be needed to determine exact criteria for the new system.

Once a Crash Data record has been validated and saved, it becomes available in the Final Validation and Approval Queue for additional validation and/or approval prior to being available for distribution and reporting. See 4.2.3.1 Final Validation and Approval Queue for more information.

The components of the new system associated with crash data record creation and initial validation are expected to be owned and operated by the CAR Unit.

4.2.2.3 Fatal Crash Data Tracking

While gathering additional data related to fatal crashes, the FDT and FARS Analyst utilize the Crash Report Case File Validation Queue to review Crash Report Case File records, using built-in filters to only see relevant records. If the FDT becomes aware of a new fatal crash event from other data sources during the data collecting process the FDT will manually create a Crash Report Case File record and indicate within the record that a corresponding crash report has not yet been received by law enforcement. The creation of this type of Crash Report Case File record will automatically trigger a notification to the FARS Analyst for related processing, as well as the MCCA for crashes involving a CMV. This replaces the current process of the FDT creating an unofficial teletype document for the new crash event and manually sending a copy to the FARS Analyst and MCCA (for crashes involving a CMV). It also eliminates the need for additional "crash report case files" representing the same crash event being created separately by the FDT, the FARS Analyst, and the MCCA (for crashes involving a CMV). Once a fatal Crash Report Case File record has been created or updated the FDT can enter additional data for fatal crash tracking purposes and the FARS Analyst can proceed with further analysis and data entry to meet FARS data requirements. The FDT and FARS Analyst also manually attaches related data reports, such as death certificates, BAC and toxicology reports, and Emergency Medical Services (EMS) records, to the Crash Report Case File record. The details of this process are yet to be determined but may involve a reference such as a URL to the document location in FileNet being added to the Crash Report Case File record.

This utilization of the Crash Report Case File Repository and Validation Queue is intended to replace the currently used Fatality Tracker and Oregon FARS Tracking Microsoft Access databases. Further analysis will be needed to determine which additional data fields will need to be captured within the record, as well as any required validation rules. The replacement of these disparate databases mitigates the risk of data deletion or corruption and preserves the integrity of the data. In addition, it reduces the need for additional fatal data reconciliation efforts.

Once a fatal Crash Report Case File record is completed, the record is ready to be batch exported to the federal FARS Records-Based Information Solution (RBIS) system and/or used for other reporting. See 4.2.4.5 FARS Data Export and 4.2.4.4 Data Reports and Products for more information.

As previously mentioned, the Crash Report Case File Validation Queue is a component of the new system and is expected to be owned and operated by the CAR Unit. However, as the additional data captured may contain personally identifiable information (PII), the new system require certain security measures to be put in place to ensure only authorized users are able to view and maintain it, and to create new Crash Report Case File records though the method described.

4.2.2.4 Motor Carrier Crash Data Tracking

While gathering additional data related to crashes involving a CMV, the MCCA utilizes the Crash Report Case File Validation Queue to review Crash Report Case File records, using built-in filters to only see relevant records. Once a Crash Report Case File record is available or created by the MCCA and has been determined by the MCCA to be federally reportable, the MCCA can proceed with further analysis and entry of additional data needed to meet federal Motor Carrier Crash data requirements.

This utilization of the Crash Report Case File Repository and Validation Queue is intended to replace the currently used SAFETYNET Microsoft Access database. Further analysis will be needed to determine which additional data fields will need to be captured within the record, as well as any required validation rules. As the SAFETYNET database is currently unsupported within the agency, the replacement of the database mitigates the risk of data deletion or corruption and preserves the integrity of the data. In addition, it reduces the need for additional fatal data reconciliation efforts for CMV crashes involving a fatality.

Once a motor carrier Crash Report Case File record is completed, the record is ready to be batch exported to the Motor Carrier Management Information System (MCMIS) and/or used for other reporting. See 4.2.4.6 Motor Carrier Crash Data Export and 4.2.4.4 Data Reports and Products for more information.

As previously mentioned, the Crash Report Case File Validation Queue is a component of the new system and is expected to be owned and operated by the CAR Unit. However, the nature of the additional data captured may require certain security measures to be put in place to ensure only authorized users are able to view and maintain it, and to create new Crash Report Case File records though the method described.

4.2.3 Data QA/QC

4.2.3.1 Final Validation and Approval Queue

Once a Crash Data record has been initially validated and saved, it becomes available in the Final Validation and Approval Queue. The data in the Queue is regularly run against a number of queries related to data QA/QC. Further analysis will be needed to determine what queries will be needed for final validation and the cadence of which these queries should run. If no data issues are found with a record, that record will be automatically approved for data distribution and reporting. Any data issues identified through these queries will be flagged for the record and returned to the Queue, and the new system will notify the CDT Team Lead of new records needing further manual validation. The CDT Team Lead can then review the records flagged in the Queue and determine if further corrections are needed. If so, the CDT Team Lead can make the necessary corrections or send the record to the responsible CDT to update. Appropriate corrections will be made, and the record will reappear in the Queue for final validation the following night. If no corrections are needed for a record, the CDT Team Lead manually approves the record for distribution and reporting.

The Final Validation and Approval Queue is a component of the new system and is expected to be owned and operated by the CAR Unit.

4.2.3.2 Fatal Data Reconciliation Queue

Once fatal Crash Report Case File records and Crash Data records have been completed, they are made available in the Fatal Data Reconciliation Queue. The FARS Analyst, CDT Team Lead, and MCCA will regularly use a system function built into the Queue to compare the data within the Crash Data record and the corresponding Crash Report Case File record to determine is consistent to the extent expected. This allows staff to reconcile any differences in fatal data between the two record types prior to submission to the FARS RBIS system or MCMIS for motor carrier crashes that involved a fatality. It also allows the identification of data elements that may require further analysis and updates. Further analysis is needed to determine which data fields require comparison, acceptable margins of difference, and the cadence for which the comparisons should be made.

The Fatal Data Reconciliation Queue is a component of the new system and is expected to be owned and operated by the CAR Unit.

4.2.4 Data Distribution and Reporting

4.2.4.1 Crash Data Query Builder

Once Crash Data records have undergone final validation and approval, they will be immediately available for use in internal and external facing data query and mapping components. The internal- and external-facing data query and mapping tools will largely have functional parity, allowing for query creation and report generation through a user-friendly query building interface. The tools will also allow users to type query statements directly into the Query Builder component without relying on the query building interface, eliminating the need to rely on third party tools to develop and trouble-shoot more complex queries. Security measures will need to be in place to prevent certain actions being taken through directly typed queries to protect the integrity of the data.

The Query Builder component will include a searchable query library and allow internal users to save queries and make a stored query available for future use. Security measures may need to be put in place to determine which queries should be available for use in the external-facing component, and which should be internal-only. External users will also have the ability to save a query for future use, though this may or may not be included in the query library.

The Query Builder component will allow for report generation based on the query created or selected, and these reports can be exported in a variety of formats, including the ability to view the queried Crash Data records in a geospatial mapping tool. Help resources are available within the component to guide users and give context where necessary. In addition, the component will allow for Crash Data records, fatal crash tracking data, and motor carrier crash tracking data to be downloaded in raw and decoded formats for use by crash data power users.

The Query Builder component will be designed to be intuitive and user-friendly and provide a one-stop-shop for crash data, mitigating the various difficulties experienced by data users of our current tools. It is expected to replace the TransViewer tool and potentially other crash data tools as well. Further analysis is needed to determine which tools may be replaced.

The Crash Data Query Builder is a component of the new system and is expected to be owned and operated by the CAR Unit, with the external-facing component view being operated by any data customer.

Crash Data Mapping Tool

In an effort to meet a variety of data customer needs and replace the numerous disparate mapping tools, the new system will include a singular Crash Data Mapping Tool that will be used to display the results of any data query on a geospatial map. This tool will be accessible from the Crash Data Query Builder component as well as on its own and will interface with the Query Builder component to allow users to build a query or use an existing query to view crash data on a map.

The Crash Data Mapping Tool is a component of the new system and is expected to be owned and operated by the CAR Unit, as well as operated by any data customer. The Transportation Data Section's

Geographic Information Services (GIS) Unit may also be involved in ownership and maintenance. Further analysis of the needs of this mapping tool will help determine maintenance responsibilities.

4.2.4.2 Crash Data Report Builder

The new system will include a Crash Data Report Builder component to allow for the easy creation and maintenance of report templates within a searchable template library for use in conjunction with stored queries. This will eliminate the difficulties currently experienced with report formats that have been created using legacy tools no longer supported by Agency resources. This component will directly integrate with SQL Server Reporting Services (SSRS), which builds off of an ongoing project in collaboration with the Business Intelligence/Data Warehouse (BIDW) section to automate the generation of certain key data reports and products.

This component will also allow for the creation and maintenance of report templates related to fatal crash tracking data (including data specific to FARS) and motor carrier crash tracking data.

The Crash Data Report Builder is a component of the new system and is expected to be owned and operated by the CAR Unit, though BIDW may be a key data partner.

4.2.4.3 Crash Data Request Manager

While the implementation of the Crash Data Query Builder component is expected to reduce the amount of data requests submitted to the CAR Unit, there will still be a need for the CAR Unit to manage and respond to requests that are more complex or require a quick turn-around time. In the new system, the CAR Unit Crash Data Analysts (CDAs) and the Crash Data Reporting Technician (CDRT) will utilize the Crash Data Request Manager component to manage and respond to requests. In addition, data requestors will also use an external-facing form within the Request Manager component to submit data requests. This form will contain a number of fields, some of which may be required, to help the requestor explain with more specificity what data they are requesting, which format they would like to receive the data in, and which data fields are needed. This allows the CDAs and CDRT to more easily interpret what the requestor needs and fulfill the request in less time.

When a new data request is received, it is saved to the Crash Data Request Database and displayed in the Crash Data Request Manager component with indicators showing the request status. Notification of the new request are then sent to the CDAs and CDRT. The CDAs and CDRT can then assign the request, indicate it as in-progress, fulfill it, and then indicate it as completed, all within a contained system component. This component is expected to replace the existing Crash Data Request Log Microsoft Access database.

The Crash Data Request Manager is a component of the new system and is expected to be owned and operated by the CAR Unit.

4.2.4.4 Data Reports and Products

Once Crash Data records have undergone final validation and approval, they will be immediately available for inclusion in data reports and products generated automatically or through queries. Further analysis will be needed to determine which reports and products are still relevant and need to be built out into the new system.

In addition to reports for Crash Data records, the new system will also allow for the automated generation of other reports related to fatal crash data (including data specific to FARS) and motor carrier crash data. This will allow for a more consistent distribution cadence and less manual work for staff.

All reports and products are owned and maintained by the CAR Unit.

4.2.4.5 FARS Data Export

Once a fatal Crash Report Case File record has been completed and all necessary FARS data has been entered, the record is ready to be exported. The FARS Analyst is able to set up a nightly batch transfer of the necessary data directly to the federal FARS RBIS system, eliminating the current need for redundant data entry. Further analysis and discussion with federal partners will be needed to determine if this is possible, or what alternate methods may be available to transfer the data.

The FARS Data Export is a function of the new system and is expected to be owned and operated by the CAR Unit, though consultation with federal FARS partners may be necessary.

4.2.4.6 Motor Carrier Crash Data Export

Once a motor carrier Crash Report Case File record has been completed and all necessary data has been entered, the record is ready to be exported. The MCCA is able to set up a nightly batch transfer of the necessary data directly to MCMIS, eliminating the current need to manually trigger the data transfer at the end of each working day. Further analysis and discussion with federal partners will be needed to determine if this is possible, or what alternate methods may be available to transfer the data.

The Motor Carrier Crash Data Export is a function of the new system and is expected to be owned and operated by the CAR Unit, though consultation with federal Motor Carrier partners may be necessary.

4.2.4.7 Operations and Performance Measures Reporting

In addition to reporting on crash and tracking data, the new system also allows for reporting on the Crash Report Case File records through the Operations and Performance Measures Reporting component. This allows CAR Unit staff to easily query records and determine how many Case Files of a specific type, from a specific location, etc. are awaiting coding and Crash Data record creation at any given time. It also allows for the CAR Unit manager or CDT Team Lead to review coder production with dashboards and reports, similar to the tools the Unit currently utilizes. Further analysis is needed to determine what query options and report types may be needed.

In addition, the component will aid the FDT, FARS Analyst, and MCCA in determining which records are missing certain key pieces of data or related documents. For example, the FARS Analyst would use the component to determine which fatal crash records are missing the required EMS record. The Analyst can then generate request letters to send to the appropriate EMS providers, pulling necessary data directly from the relevant Crash Report Case File records into a letter template or manually entering data into a record for those not received electronically. This replaces the current highly manual workflow. The Analyst will also regularly use the component to find records that do not indicate a crash report has been received from law enforcement and request copies from the respective law enforcement agencies as necessary. In addition, the MCCA would use the component to generate CMV compliance letters and other standardized information requests. The system would also be able to track the number of attempts made to contact and solicit information from a variety of external parties. This will provide a standardized way to track communications that does not currently exist.

Operations and Performance Measures Reporting is a component of the new system and is expected to be owned and operated by the CAR Unit.

4.2.5 Other Functions of the New System

In addition to the previously mentioned components, the new system will also include a robust training component that helps bring new CDTs up to speed in less time than it currently takes and with less reliance on already over-burdened staff resources. Further analysis will be needed to determine exact training requirements.

The new system will also allow for users with an administrative role to perform certain system maintenance functions, such as maintaining reference tables and distributing description value changes in the Crash Data Record database, and other batch functions similar to those in the existing CDS. Further analysis will be needed to determine which management functions will be relevant to the new system. A new function that will be needed is the ability to manage the various validation rules that run against the data. This includes validation rules that run when a CDT saves a Crash Data record and when those records undergo final validation, as well as the validation rules that run when the FARS Analyst and MCCA save data to the respective data tracking pieces of the Crash Report Case File records. By allowing the administrative users to manage these validation rules, the need to rely on individuals external to the CAR Unit who may not have the same in-depth knowledge of the data for validation rule maintenance is greatly reduced.

In addition to system maintenance, the new system will also allow for user management. This will not only allow for users with administrator roles to grant or deny various permissions for other users but will also allow the users themselves to manage certain user account settings, such as customizing system notifications. This allows for the CAR Unit to be more self-sufficient and reduce the need to rely on the ODOT Information Systems Branch to manage system permissions.

The new system will also allow for the FDT, FARS Analyst, MCCA, and CDTs to import data from a variety of sources. This includes importing crash data from a PDF or Microsoft Excel file to create crash data records, as well as importing fatal or motor carrier crash tracking data to update corresponding Crash Report Case File records. This functionality will prevent redundant manual data entry in the event of a system outage or if the coding of certain crash types is outsourced.

The components and functions of the new system associated with training, system management, user management, and data import are expected to be owned and operated by the CAR Unit.

4.2.6 Performance Characteristics

Exact performance requirements have not yet been defined, however performance measures under consideration include:

- Time taken to receive a crash report – The amount of time taken for a citizen or law enforcement officer to submit a crash report from the time of the crash event.
- Time taken to transfer crash report data – The amount of time taken from when a new crash report is received by the DMV CRU to transfer or make available to the CAR Unit for further processing.

- Number of crash reports processed per day – The number of crash reports processed per day by CAR Unit staff. The performance expectations will differ depending on the operational scenario selected.
- Time taken to distribute crash data – The amount of time taken from when a crash report is transferred or made available to the CAR Unit to release the coded, located, and validated data to the public.
- Number of data requests received and fulfilled – The number of requests received and fulfilled by CAR Unit staff.
- Time taken to complete QA/QC – The amount of time taken to perform all necessary quality assurance/quality control procedures before the data can be released for distribution.

4.2.7 Requirements

This is an initial list of proposed system requirements based on our current understanding of needs for the proposed system and may change during the design, development, and testing phases of the project.

4.2.7.1 Security and Data Integrity

The data collection subsystem will have appropriate security measures in place to prevent the inadvertent access or distribution of any PII submitted. The data processing subsystem will make use of application roles to determine access to the various subsystem modules to ensure users are only able to access modules related to their work duties and preserve the integrity of the data. This also applies to the internal-facing query and mapping tool included in the data distribution subsystem. Security measures may be required for the data distribution subsystem's external-facing data query and mapping tool, and any tools developed to integrate crash data with data from other sources.

4.3 Participants and Actors of the Proposed System

The following table describes the participants and actors for the proposed system, the functional area, roles and responsibilities, and the expected changes from the current system. Note that the changes from the current system listed may occur over time as opposed to immediately upon implementation of the proposed system.

Table 4-1 – Participants and Actors of the Proposed System

Functional Area	Participants (Individual or Group)	Actor Responsible for Implementation (Individual or Group)	Roles and Responsibilities	Changes from Current System
Data Collection	Citizens/drivers	DMV CRU	Submit a crash report within 72 hours of a reportable crash event.	A new, fully electronic report submittal method.
Data Collection	Law Enforcement agencies	DMV CRU	Submit a crash report within 10 days of a reportable crash event that the law enforcement officer investigated.	A fully electronic report submittal method.
Data Collection	DMV Mailroom	DMV Mailroom	Forward paper crash reports received by mail to the DMV CRU.	A reduction in the number of paper reports received.
Data Collection	DMV CRU	DMV CRU	Manually review paper crash reports to determine if they are reportable under the relevant OAR requirements. Also manually review, if necessary, any electronic crash reports to determine if they are reportable. Send paper crash reports to the DMV Imaging Team. Manually match crash reports to reports in an existing Crash Report Case File using the Crash Report Matching and Validation component. If a report is unmatched, manually create a new Crash Report Case File for it and generate and assign a new DMV Accident Number. **Note:** Due to a backlog of reports received, the imaging process may need to take place after the matching process. Other duties performed alongside or between the above steps are outside of the scope of this project.	For electronic crash reports, acceptance and matching processes are automated to the extent possible through new components to existing systems.
Data Collection	DMV Imaging Team	DMV CRU	Receive paper crash reports from the DMV CRU Crash Report Processors and scan to create image file(s) of the crash report, then send imaged files back to Crash Report Processors to be manually matched	A reduction in the number of paper reports received by the DMV Mailroom. A new Crash Report Matching and Validation component that allows the user to attach the

			through the Crash Report Matching and Validation component.	imaged report directly to the corresponding Crash Report Case File.
Data Processing	CAR Unit File Management Technician	CAR Unit	Sort Crash Report Case File records in the Crash Report Case File Validation Queue component in the new system by injury severity and edit record data if necessary to include or update basic data elements needed by the CAR Unit CDTs.	A new environment to review crash reports and a new process to add/edit basic data elements as necessary.
Data Processing	CAR Unit Crash Data Technicians	CAR Unit	Review records in the Crash Report Case File Validation Queue to determine which are ready to be coded. Add or update the injury severity level as necessary. **Operational Scenario A:** For electronic reports, create a new Crash Data record by directly importing data from the Crash Report Case File record. Validate and confirm or update a crash location if one was imported or add a new crash location. Analyze the Crash Report Case File record to code and enter additional data fields into the Crash Data record. Save the record as in-progress, or if finished, validate and save the record. Process any paper crash reports through the Operational Scenario B description below. **Operational Scenario B:** For paper reports, open the imaged report file directly from the Crash Report Case File Validation Queue and manually create a new Crash Data record. Analyze the report data and code and enter all data fields as necessary. Add a new crash location. Save the record as in-progress, or if finished, validate and save the record.	**Operational Scenario A:** Less manual data entry for electronic crash reports. New system interfaces for data entry, location identification, and data validation. A smaller number of paper crash report files are accessed from the Crash Report Case File Validation Queue. **Operational Scenario B:** New system interfaces for data entry, location identification, and data validation. Crash report files are accessed from the Crash Report Case File Validation Queue.

Data QA/QC	CAR Unit CDT Team Lead	CAR Unit	Review records in the Final Validation and Approval Queue that failed final validation. Update records as needed, or manually approve for data distribution and reporting. Trigger fatal data reconciliation process through Fatal Data Reconciliation Queue. Review failed records and work with other staff to make corrections if necessary.	A new system interface to review and approval records that failed final validation. Reduced number of records requiring review and approval. A new system interface to trigger automated fatal data reconciliation processes. Greatly reduced manual efforts for reconciliation.
Data Collection, Data Processing, Data Distribution	CAR Unit Fatal Data Technician	CAR Unit	Research fatal crashes and enter tracking data into the corresponding Crash Report Case File record. Manage automated report generation and distribution through the new system.	A new system interface to enter fatal crash tracking data, replacing the existing Fatality Tracker Microsoft Access database and eliminating the need for a redundant "case file." Automatic notifications of new or updated fatal crash data or supplemental data. A way to automate report generation to allow for a consistent distribution cadence.
Data Collection, Data Processing, Data QA/QC, Data Distribution	CAR Unit FARS Analyst	CAR Unit	Receive notification of new or updated fatal crash records or supplemental data within the new system. Gather data from external sources and add to the corresponding Crash Report Case File. Enter FARS tracking data into the corresponding Crash Report Case File record. Trigger fatal data reconciliation process through Fatal Data Reconciliation Queue. Review failed records and work with other staff to make corrections if necessary or approve export of records to the federal FARS RBIS system. Manage automated report generation and distribution through the new system.	Automatic notifications of new or updated fatal crash data or supplemental data. A new system module interface to enter FARS tracking data, replacing the existing Oregon FARS Tracking Microsoft Access database and eliminating the need for a redundant "case file." A new system interface to trigger automated fatal data reconciliation processes. Greatly reduced manual efforts for reconciliation. A way to automate report generation to allow for a consistent distribution cadence. A way to easily export data from the new system to RBIS.

			Schedule and manage automated data export from the new system to the federal FARS RBIS system.	
Data Collection, Data Processing, Data QA/QC, Data Distribution	CAR Unit Motor Carrier Crash Analyst	CAR Unit	Receive notification of new or updated CMV crash records or supplemental data within the proposed system. Enter CMV crash tracking data into the corresponding Crash Report Case File record. Trigger fatal data reconciliation process through Fatal Data Reconciliation Queue. Review failed records and work with other staff to make corrections if necessary or approve export of records to MCMIS. Manage automated report generation and distribution. Schedule and manage automated data export from the new system to MCMIS.	Automatic notifications of new or updated CMV crash data or supplemental data. A new system module interface to enter CMV crash tracking data, replacing the existing SAFETYNET Microsoft Access database and eliminating the need for a redundant "case file." A new system interface to trigger automated fatal data reconciliation processes. Greatly reduced manual efforts for reconciliation. A way to automate report generation to allow for a consistent distribution cadence. A way to easily export data from new system to MCMIS.
Data Distribution	CAR Unit Crash Data Reporting Technician	CAR Unit	Receive and fulfill crash data requests through the new Crash Data Request Manager component. Provide assistance to users of the proposed crash data query and mapping tools. Participate in testing of new data tool updates.	A new data querying interface to generate reports in response to data requests. A reduction in data requests received. A new system interface to receive, track, and respond to data requests.
Data Distribution	CAR Unit Crash Data Analysts	CAR Unit	Receive and fulfill crash data requests through the new Crash Data Request Manager component. Provide assistance to users of the proposed crash data query and mapping tools. Manage automated data product generation and distribution. Participate in testing of new data tool updates.	A new data querying interface to generate reports in response to data requests. A new data product management interface. A reduction in data requests received. A new system interface to receive, track, and respond to data requests.

Data Distribution	Crash data users (internal and external)	CAR Unit	Query and export crash data using user-friendly query creation tools or queries created by CAR Unit staff. View queried data on a map. Generate reports and export in a variety of formats. Request crash data through a standardized form within the Crash Data Request Manager component.	A new one-stop-shop tool to query and export data in a variety of formats, including display on a map. A new streamlined way to submit data requests.

4.4 Support Environment

As previously stated, the ownership and operation of new components of existing systems is expected to be the responsibility of the DMV CRU, while the ownership and operation of the new system replacing the CDS will be the responsibility of the CAR Unit. Any new systems or new components of existing systems developed for the proposed system may be supported by ODOT's Enterprise Application Services section or a third-party vendor, though this has not yet been determined.

Aside from new systems, components, and databases, the following systems and data sources will support the overall proposed system:

- FileNet: This document sharing system will be utilized by the DMV CRU and the CAR Unit to store the imaged crash reports and other supplemental documents that will be attached to the individual Crash Report Case File records. While the use of a singular FileNet between the two Units is ideal to reduce the amount of file duplication, further analysis is needed to determine if that is possible.
- SQL Server Reporting Services: This system will support the automation of various official crash data products and regularly requested reports.
- GIS Application Spatial Data: This data will be utilized in the crash locator component of the proposed data processing subsystem, as well as the data query and mapping tools included in the proposed data distribution subsystem.
- TransInfo and Highway Network Data: This system and data will be used to supplement and inform the GIS Application Spatial Data.
- Portland State University Population Data: This data will be imported into the new system to provide additional necessary context to the Crash Data record.
- Oregon State Police (OSP) Patrol Area Data: This data will be utilized through the new system to generate rate books.
- OSP Law Enforcement Data System (LEDS): This system will be utilized by the CAR Unit FDT and/or FARS Analyst to gain knowledge of new crash events involving fatalities in a timely manner.
- Other data sources: Other data sources currently used and outlined in Current System and Environment will be utilized to gather additional data about a crash event involving a fatality or CMV.

4.5 Modes of Operation for the Proposed System

The following modes of operation apply to the overall proposed system.

4.5.1 Normal Mode of Operation

In this operational mode, the overall proposed system operates as expected. All users perceive the system to be in a fully functional state, and components are being monitored by specified personnel. The following describes users' experiences during a normal mode of operation.

- **Citizens/law enforcement:** These users utilize online applications to fill out and submit crash report data to the DMV CRU without experiencing issues or receiving errors, and they receive confirmation that their report has been submitted. The data upload is timely.
- **DMV CRU:** DMV CRU staff operate the OLIVR system normally. Staff are able to perform manual tasks and trigger automated functions without experiencing issues or receiving errors. Confirmation messages are received throughout the various process steps. The system performs automated tasks efficiently with no errors being returned. The automated and manual creation of Crash Report Case File records within the Crash Report Case File Repository (process is dependent on which operational scenario is selected and whether the report is paper or electronic) is timely.

- **CAR Unit CDTs:** The CDTs operate the new system normally according to the operational scenario selected. Staff are able to perform manual and trigger automated tasks without experiencing issues or receiving errors. Any lag in the crash location identification process is none to minimal, within acceptable standards. Data entry and validation is timely.
- **CAR Unit FDT/FARS Analyst/MCCA:** These staff add and edit data for fatal or motor carrier crash data tracking from the Crash Report Case File Validation Queue within the new system normally, without experiencing issues or receiving errors. The FARS and Motor Carrier Crash Analyst trigger the automatic export of data to their respective federal reporting systems without experiencing issues or receiving errors. Data entry, notification of new or updated data, and data export are timely.
- **CAR Unit CDAs/CDRT:** These staff operate the various components of the new system within the data distribution functional area normally without experiencing issues or receiving errors. Data querying and report generation is timely. Data requests are received in a timely manner.
- **Crash data users:** These users utilize the data query and mapping tools and the data request form within the new system normally without experiencing issues or receiving errors. Data querying and report generation is timely within acceptable standards. Data requests can be submitted in a timely manner.

4.5.2 Degraded Modes of Operation

In this operational mode, the overall proposed system loses a critical component, either partially or fully. While other components remain fully functional, the loss of this component breaks part of the overall proposed system's process chain and requires the utilization of redundant processes. Degraded modes of operation primarily stem from the following types of events: electronic crash report submission component degradation, OLIVR system degradation, and the degradation of a component within the new system.

4.5.2.1 Electronic Crash Report Submission Component Degradation

The following describes users' experiences during the degradation of the electronic crash report submission component, as well as the impacts further down the process chain.

- **Citizens/law enforcement**: These users utilize online applications or other means to fill out and submit crash report data to the DMV CRU, but some or all users experience issues or receive errors. A user may choose to wait to submit their report at a later time when the application is restored, but submission must be completed within the required reporting deadlines. The user may need to submit their report via the manual paper reporting process instead.
- **DMV CRU:** DMV CRU staff operate the OLIVR system normally. Staff are able to perform manual tasks and trigger automated functions without experiencing issues or receiving errors. The system performs automated tasks efficiently with no errors being returned. However, staff must manually process more paper crash reports than usual due to degradation of the electronic crash report submission component. As a result, the creation of Crash Report Case File records within the Crash Report Case File Repository takes longer than under a normal operational mode.
- **CAR Unit CDTs:** The CDTs operate the new system normally but rely on the manual method of processing Crash Report Case File records with paper crash reports and work through all of the various associated inefficiencies. This results in an increase in the overall processing time and a delay in the data being made available for distribution.
- **CAR Unit FDT/FARS Analyst/MCCA:** These staff add and edit data for fatal or motor carrier crash data tracking from the Crash Report Case File Validation Queue within the new system normally, however the delay in receiving crash report data from DMV CRU causes a trickle-down effect that may negatively impact the ability for staff to meet federal reporting requirements or benchmarks.
- **CAR Unit CDAs/CDRT:** These staff operate the various components of the new system within the data distribution functional area normally without experiencing issues or receiving errors, however the delay

in receiving crash report data from DMV CRU causes a trickle-down effect that results in staff not having timely access to the latest data for querying and reporting.

- **Crash data users:** These users utilize the data query and mapping tools, and the data request form within the new system normally without experiencing issues or receiving errors, however the delay in receiving crash report data from DMV CRU causes a trickle-down effect that results in data users not having timely access to the latest data for querying and reporting.

4.5.2.2 OLIVR System Degradation

The following describes users' experience during the degradation of the DMV OLIVR system or system components, as well as the impacts further down the process chain.

- **Citizens/law enforcement:** No noticeable difference from the normal mode of operation.
- **DMV CRU:** DMV CRU staff attempt to operate the OLIVR system and may receive notifications of errors or issues that may prevent the performance of manual tasks or triggering of automated functions. DMV CRU may need to follow alternate procedures to create and update Crash Report Case File records until the system is restored to full functionality. This will result in delays in making crash report data available to the CAR Unit.
- **CAR Unit CDTs:** The CDTs operate the new system normally but may rely on an alternate process for retrieving Crash Report Case File records and work through all of the various associated inefficiencies, depending on the nature of the OLIVR system degradation. This results in an increase in the overall processing time and a delay in the data being made available for distribution.
- **CAR Unit FDT/FARS Analyst/MCCA:** These staff add and edit data for fatal or motor carrier crash data tracking from the Crash Report Case File Validation Queue within the new system normally without experiencing issues or receiving errors, however the delay in receiving crash report data from DMV CRU causes a trickle-down effect that may negatively impact the ability for staff to meet federal reporting requirements or benchmarks.
- **CAR Unit CDAs/CDRT:** These staff operate the various components of the new system within the data distribution functional area normally without experiencing issues or receiving errors, however the delay in receiving crash report data from DMV CRU causes a trickle-down effect that results in staff not having timely access to the latest data for querying and reporting.
- **Crash data users:** These users utilize the data query and mapping tools, and the data request form within the new system normally without experiencing issues or receiving errors, however the delay in receiving crash report data from DMV CRU causes a trickle-down effect that results in data users not having timely access to the latest data for querying and reporting.

4.5.2.3 New System Degradation

The following describes users' experiences during the degradation of the new system replacing the CDS, as well as the impacts further down the process chain.

- **Citizens/law enforcement:** No noticeable difference from the normal mode of operation.
- **DMV CRU:** No noticeable difference from the normal mode of operation.
- **CAR Unit CDTs:** The CDTs attempt to operate the new system and may receive notifications of errors or issues that may prevent normal use. As a result, CDTs may need to rely on redundant methods for accessing and processing crash report data. Once the new system is fully restored, CDTs must utilize a data import functionality within the new system to capture the manually recorded data, a process currently referred to as the "code-to-paper" process. Alternatively, if the issue stems from the crash locator tool, the CDTs could experience significant lag or complete loss of usage which prevents timely crash location validation or identification. As a result, the CDT may need to wait for the module to be

fully restored to add crash location data to a record. This results in a delay in the data being made available for distribution.

- **CAR Unit FDT/FARS Analyst/Motor Carrier Crash Analyst:** These staff attempt to add and edit data for fatal or motor carrier crash data tracking from the Crash Report Case File Validation Queue within the new system but may receive notifications of errors or issues that may prevent normal use. As a result, staff may need to rely on alternate methods for accessing and tracking data. Once the subsystem is fully restored, staff must utilize a data import functionality within the new system to capture the manually recorded data. This may result in a negative impact on the ability for staff to meet federal reporting requirements or benchmarks.
- **CAR Unit CDAs/CDRT:** In the case of degradation of new system components unrelated to the data distribution functional area, these staff operate the various components of the new system normally without experiencing issues or receiving errors, however staff will not have timely access to the latest data for querying and reporting. In the case of degradation of new system components related to the data distribution functional area, staff attempt to operate the new system but may receive notification of errors or issues that may prevent normal use. Staff may need to rely on alternate methods to query data and generate reports in order to continue to respond to data requests. This may also result in a larger amount of data requests being submitted outside of the Crash Data Request Management component.
- **Crash data users:** In the case of degradation of new system components unrelated to the data distribution functional area, these users utilize the data query and mapping tool within the new system normally without experiencing issues or receiving errors, however they will not have timely access to the latest data for querying and reporting. In the case of degradation of new system components related to the data distribution functional area, users attempt to utilize the data query and mapping tool but may receive notification of errors or issues that may prevent normal use. Users may need to submit requests to the CAR Unit via email instead of the request form or rely on data they may already have generated prior to the subsystem degradation. This may result in less data availability for the user’s individual work needs or require the user to submit a data request to the CAR Unit which may take longer than usual to fulfill.

4.5.3 Failed Mode of Operation

In this operational mode, the overall proposed system has comprehensively failed because of the complete loss of a critical component. With systems being managed by different partners, a complete failure of all subsystems or components at the same time is very unlikely, but this mode of operation can occur when a critical link is lost, such as the complete loss of the interconnected Crash Report Case File Repository. The following are users' experiences during a failed mode of operations for the Crash Report Case File Repository.

- **Citizens/law enforcement:** No noticeable difference from the normal mode of operation.
- **DMV CRU:** DMV CRU staff attempt to operate the OLIVR system but immediately receive notification of errors or issues preventing normal use of the Crash Report Case File Repository. Electronically submitted crash reports pile up in the Crash Report Matching Queue and are unable to be automatically processed. Staff must follow alternate manual procedures to process crash report data and make it available to the CAR Unit until the Repository is restored. This results in major delays in making crash report data available to the CAR Unit.
- **CAR Unit CDTs:** The CDTs attempt to operate the Crash Report Case File Validation Queue within the new system but immediately receive notification of errors or issues preventing normal use and must rely on redundant methods for accessing crash report data. This results in a major delay in the data being made available for distribution.

- **CAR Unit FDT/FARS Analyst/Motor Carrier Crash Analyst:** These staff attempt to add and edit data for fatal or motor carrier crash data tracking from the Crash Report Case File Validation Queue within the new system but immediately receive notification of errors or issues preventing normal use and must rely on alternate methods for accessing and tracking data. Once the Crash Report Case File Repository is restored, CDTs must utilize a data import functionality within the new system to capture the manually recorded data. This results in a negative impact on the ability for staff to meet federal reporting requirements or benchmarks. In addition, staff are unable to perform any queries on the Repository related to operations and performance measures until the Repository is fully restored.
- **CAR Unit CDAs/CDRT:** These staff operate the various components of the new system within the data distribution functional area normally without experiencing issues or receiving errors, however the delay in receiving crash report data due to the failure of the Crash Report Case File Repository causes a trickle-down effect that results in staff not having timely access to the latest data for querying and reporting.
- **Crash data users:** These users utilize the data query and mapping tools, and the data request form within the new system normally without experiencing issues or receiving errors, however the delay in receiving crash report data due to the failure of the Crash Report Case File Repository causes a trickle-down effect that results in data users not having timely access to the latest data for querying and reporting.

4.6 Operational Policies and Constraints

The following are some operational policies and constraints identified for the proposed system. This is an initial list based on our current understanding of the proposed system and may change during the design, development, and testing phases of the project.

- PII: The data submitted by citizens and law enforcement, as well as some data gathered for fatal crash and FARS tracking, contains PII. The proposed system will adhere to and follow existing State and agency operating procedures for collecting and maintaining PII.
- Data Retention: The proposed system will adhere to and follow, or allow staff to adhere to and follow, all current data retention schedules.

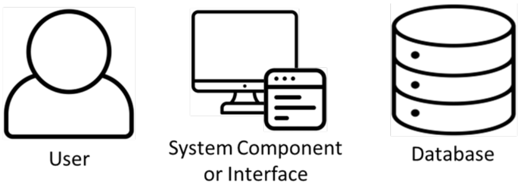
5 Operational Scenarios and Use Cases

This section presents the various use cases of the proposed system specific to each operational scenario being considered, as well as the use cases common to both operational scenarios. As described in previous sections, Operational Scenario A involves a higher level of automation in transferring data from the Driver and Motor Vehicle Services (DMV) Oregon License Issuance and Vehicle Registration (OLIVR) system to the proposed Crash Data System (CDS) replacement as well as more automation in the creation of Crash Data records, while Operational Scenario B involves more manual transfer and Crash Data record creation processes similar to the current workflow.

The use cases in this section are intended to provide a general framework and description of how various users may interact with the new and existing systems/components based on the current understanding of user needs. Each use case provides a brief description of the goal of the use case, a diagram showing the possible user and system interactions, and a brief narrative description of these interactions, as well as related user needs (UN) from the full list of user needs in 3.2.1 User Needs Breakdown, if applicable. A use case may also include additional pertinent information, such as development or implementation considerations or descriptions of further analysis required. The diagrams and descriptions are intended to give a general idea of user and system interactions only and should not be considered prescriptive instructions on how the proposed systems must function.

Each use case diagram may include user actions or events outside of the system, user actions within the system, and actions performed by the system. These actions are differentiated using the shading scheme below. In addition, actions are further differentiated by color denoting their general functional area.

Use Case Diagram Legend – Common Icons



Use Case Diagram Legend – Icon Color Denotations

Each use case is uniquely identified by indicating the operational scenario, overall functional area, a sequential use case number, and a sequential child use case number (if applicable). The assigned use case IDs are prefixed with "UC" (denoting "Use Case") and include the following abbreviations:

- Operational scenario:
    - C – Common to both operational scenarios
    - A – Related to Operational Scenario A
    - B – Related to Operational Scenario B
- Functional area:
    - DC –Data Collection
    - DP – Data Processing
    - DD – Data Distribution and Reporting
    - O – Other

5.1 Data Collection Use Cases

This section contains the use cases for the proposed system related to the functional area of data collection. The use cases are divided between those common to both operational scenarios and those related to each operational scenario.

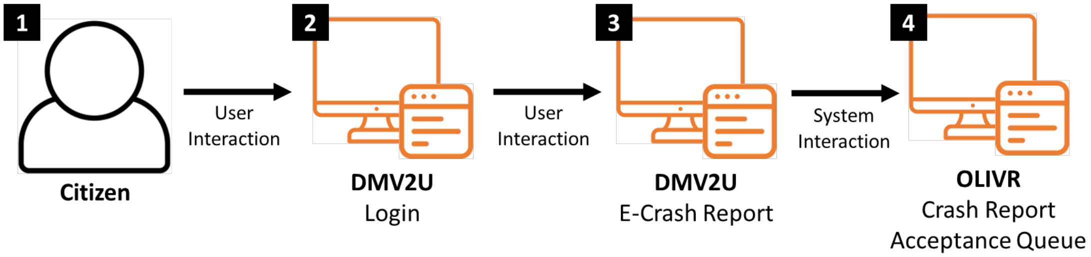
5.1.1 Common Use Cases

Below are the use cases for the proposed system common to both operational scenarios. A use case may include notes about usage pertaining to a specific operational scenario, if necessary.

5.1.1.1 UC-C-DC-01 – Citizen Submits Electronic Crash Report

In this use case, a citizen/driver involved in a crash event submits a crash report via an electronic submission method. The goal of this use case is to provide an easier way for users to submit crash reports, mitigating the current issues experienced with the paper submission method and encouraging a more timely and complete report submission.

Use Case Diagram



Use Case Description

The user (1) navigates to the DMV2U application, registers a new account (if the user does not already have one), and logs in (2). The user then navigates to the E-Crash Report (3) and navigates through the various pages of the report form, filling in data as necessary. The user may choose to save a report as in-progress to return to later. Once complete, the user submits their crash report. Upon submission, the DMV2U application transfers the data to the Crash Report Acceptance Queue (4) to determine acceptability.

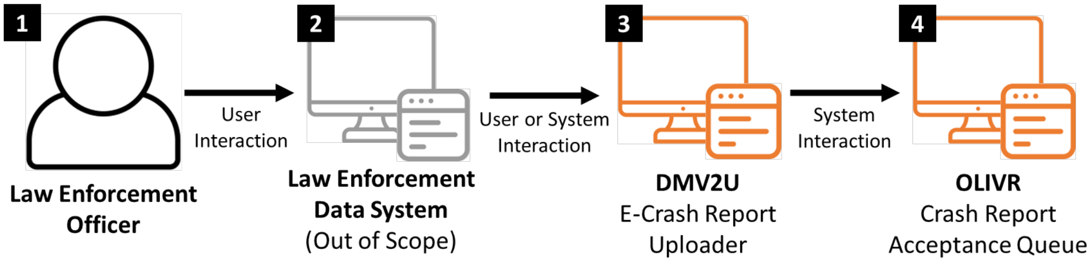
Related User Needs

- UN-C-DC-CIT-01
- UN-C-DC-CIT-01-01

5.1.1.2 UC-C-DC-02 – Law Enforcement Submits Electronic Crash Report

In this use case, the law enforcement officer investigating a crash event submits a crash report via an electronic submission method. The goal of this use case is to provide an easy way for law enforcement to submit crash reports, mitigating the current issues experienced with the paper submission method and encouraging more timely and complete report submissions.

Use Case Diagram



Use Case Description

The law enforcement officer (1) is dispatched to the scene and investigates the crash event. The officer then enters data into the respective system used by that department (e.g., the Law Enforcement Data System) (2). The officer then uses the E-Crash Report Uploader (3) in the DMV2U application to upload the crash report. Once a report has been uploaded, the DMV2U application transfers the data to the Crash Report Acceptance Queue to determine acceptability (4).

Additional Information

The general concept for the E-Crash Report Uploader is not yet determined but may consist of a user interface requiring a user account, or an authenticated Application Programming Interface (API) endpoint for the law enforcement data systems to connect to, or some other method. There may be potential for the law enforcement agencies' data systems to interact directly with ODOT's to transfer the crash report data. Further analysis will be needed to identify all options and determine the approach that will work best for all partners. Any method developed will likely require legislative action enforcing the adoption of the method to be truly effective. There may also be unknown associative costs involved.

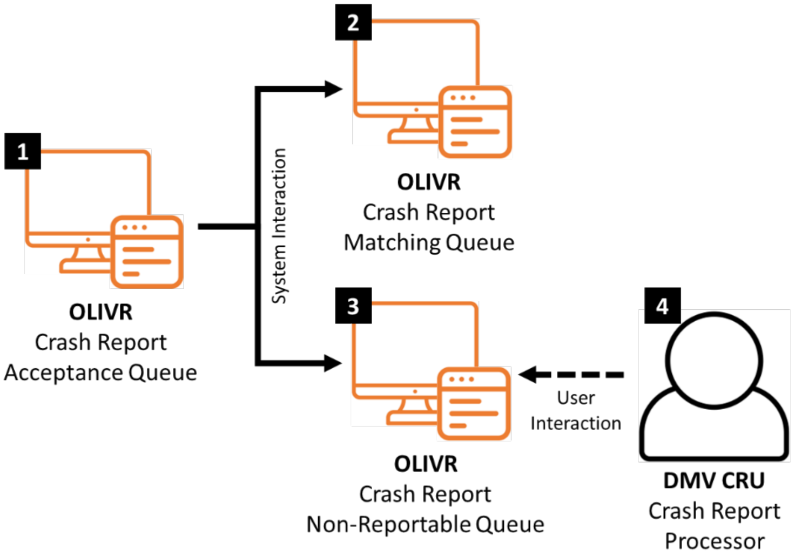
Related User Needs

- UN-C-DC-LE-01
- UN-C-DC-LE-01-01
- UN-C-DC-LE-01-02

5.1.1.3 UC-C-DC-03 – Determine Electronic Crash Report Acceptability

In this use case, the proposed system automatically determines if the submitted crash report is reportable under the standards defined in Oregon Revised Statute (ORS) 811.720. The goal of this use case is to provide an automated way to determine if the crash report is reportable to reduce the number of reports requiring manual review.

Use Case Diagram



Use Case Description

After the proposed system transfers the crash report data from the DMV2U application to the OLIVR system, it appears in the Crash Report Acceptance Queue (1). The proposed system then tests the report data against the criteria defined in ORS 811.720, and flags it as reportable or non-reportable. Reports flagged as reportable then appear in the Crash Report Matching Queue (2) and reports flagged as non-reportable appear in the Crash Report Non-Reportable Queue (3). The proposed system then proceeds with the crash report matching process (see UC-A-DC-01 or UC-B-DC-01). Regularly, a DMV CRU Crash Report Processor (4) will manually review the reports in the Non-Reportable Queue (3) to determine if there are any crash reports that may have been incorrectly flagged as non-reportable by the automated system and flags the reports as reportable if necessary.

Additional Information

Further analysis will be needed to determine the following:

- Which data fields in the crash report are used to determine crash report acceptance.
- The cadence in which crash reports in the Crash Report Non-Reportable Queue should be reviewed.

Note that any process steps that are out of scope of this project are not included in the diagram or description for this use case, including but not limited to additional DMV CRU processes such as insurance verification.

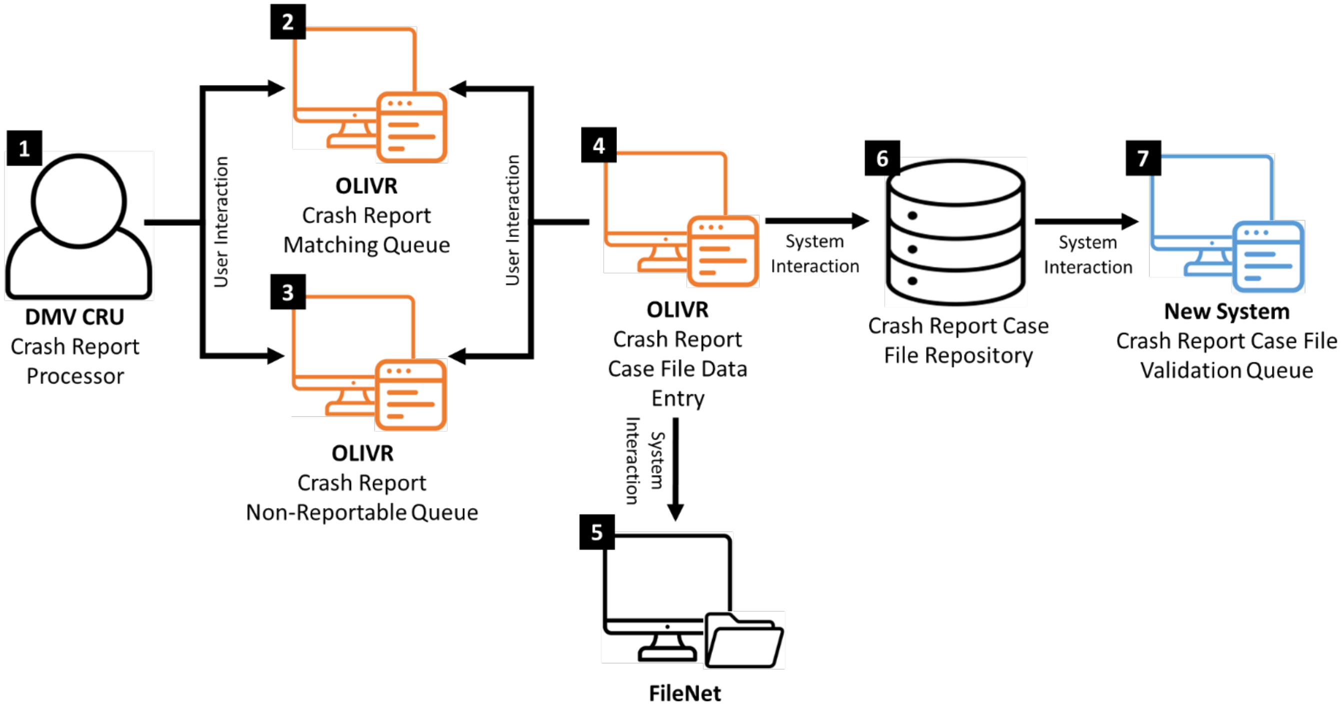
Related User Needs

- UN-C-DC-CRU-01

5.1.1.4 UC-C-DC-04 – Paper Crash Report Matching

In this use case, a DMV CRU Crash Report Processor matches a newly received paper crash report to an existing Crash Report Case File record or creates a new record if no match is found. The goal of this use case is to simplify and streamline the matching process so the CAR Unit Crash Data Technicians (CDTs) can receive matched paper crash reports in a timelier manner.

Use Case Diagram



Use Case Description

Once an imaged crash report was reviewed for acceptance, if it was marked as reportable, the DMV CRU Crash Report Processor (1) searches for a matching Crash Report Case File record using the Crash Report Matching Queue (2). If no match is found, the Processor searches for a matching record in the Crash Report Non-Reportable Queue (3). If no match is found in either Queue, the Processor uses the Crash Report Case File Data Entry interface to create a new record (4). The Processor enters the high-level data necessary for future matching, sets major flags as applicable, and determines and assigns a crash severity level. If a match is found in either Queue, the Processor edits the record using the Crash Report Case File Data Entry interface (4). The

Processor reviews and updates the high-level data, reviews and sets major flags, and reviews and updates the crash severity level if necessary.

If the imaged crash report was marked as non-reportable, the Processor creates a new record and enters the high-level data necessary for future matching and sets major flags as applicable. The Processor may or may not determine and assign a crash severity level at this time.

Once a record has been created or updated for the new crash report, the Processor uploads the imaged crash report file using the Crash Report Case File Data Entry interface and saves the record (4). The proposed system then uploads the crash report file to the appropriate FileNet location (5) and adds a reference to the location on FileNet to the record and saves it to the Crash Report Case File Repository (6). The record then appears in the Crash Report Case File Matching Queue (2) for future matching, or the Crash Report Case File Non-Reportable Queue (3) depending on if it was flagged as reportable or non-reportable. Reportable records also appear in the Crash Report Case File Validation Queue for further CAR Unit processing (7).

Additional Information

Further analysis will be needed to determine the following:

- If the proposed system can utilize Optical Character Recognition (OCR), or an Artificial Intelligence (AI) technology for text and handwriting recognition, to mitigate the manual process of matching paper reports, entering/updating high-level data, etc. and if use of OCR is both possible and an effective approach given the number of reports that are filled out by hand.
- Which fields are used to determine the injury severity level.
- Which data fields are used in the matching process, which major flags required, and which data fields are used to set them.
- When a Case File record should no longer appear in the Crash Report Case File Matching Queue and the Crash Report Case File Non-Reportable Queue.
- The process to associate an imaged crash report PDF file with a Crash Report Case File record, as the process described above is intended to describe an overall need but may not be the actual process used in the proposed system.

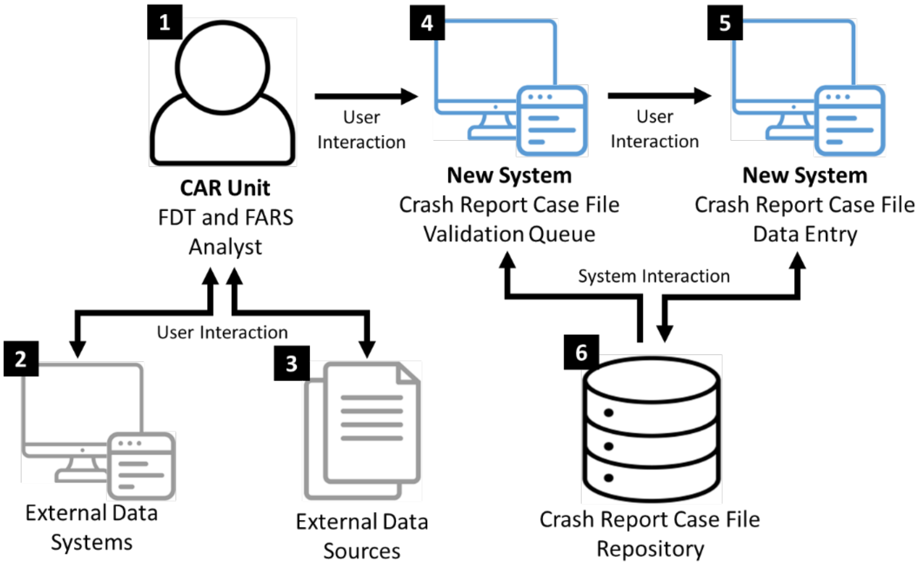
Related User Needs

- UN-C-DC-CRU-03
- UN-C-DC-CAR-03
- UN-A-DC-CRU-01

5.1.1.5 UC-C-DC-05 – Fatal Crash Data Collection

In this use case, the CAR Unit Fatal Data Technician (FDT) or the Fatality Analysis Reporting System (FARS) Analyst gathers and receives additional fatal crash data from a variety of sources in order to match the data to an existing Crash Report Case File record or create a new record if no match is found. The goal of this use case is to allow for the FDT and FARS Analyst to gather the additional fatal crash data necessary to meet fatal crash data tracking needs and FARS reporting requirements.

Use Case Diagram



Use Case Description

The FDT and FARS Analyst (1), collectively referred to as "user" in this use case description, gather and receive fatal crash data from a variety of external sources (2, 3). A list of these sources can be found in 2.1.2 State File Fatal Crash Data Collection and 2.1.3 FARS Data Collection. The user also uses the Crash Report Case File Validation Queue to access the Crash Report Case File records, filtering the list of all records to only see those involving fatalities (4). The user then reviews data from all sources and searches the records in the Validation Queue for a crash matching the data provided in other sources (4). The user then uses the Crash Report Case File Data Entry interface to create a new, or edit an existing, record depending on if a match is found (5, see UC-C-DP-07 or UC-C-DP-08), as well as upload related data documents and associate them with the record. The record is then saved to the Crash Report Case File Repository (6).

Additional Information

Note that the FDT position, processes, and responsibilities are currently being evaluated for revision in 2023, so some of the process steps listed here may be subject to change.

Within the proposed system, security trimming will need to be enforced so that only certain users can view the additional data related to fatal crash reporting within a Crash Report Case File record in order to prevent unauthorized users from accessing any personally identifiable information (PII) present.

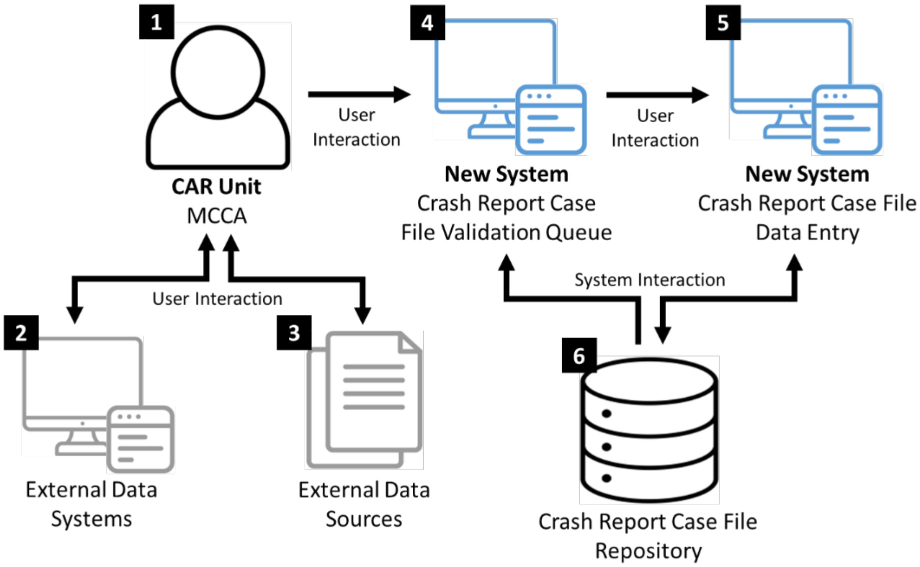
Related User Needs

- UN-C-DP-CAR-08

5.1.1.6 UC-C-DC-06 – Motor Carrier Crash Data Collection

In this use case, the CAR Unit Motor Carrier Crash Analyst (MCCA) gathers and receives additional Commercial Motor Vehicle (CMV) crash data from a variety of sources in order to match the data to an existing Crash Report Case File record or create a new record if no match is found. The goal of this use case is to allow for the MCCA to gather the additional CMV crash data necessary to meet federal reporting requirements.

Use Case Diagram



Use Case Description

The MCCA (1) gathers and receives CMV crash data from a variety of external sources (2, 3). A list of these sources can be found in 2.1.4 Motor Carrier Crash Data Collection. The MCCA also uses the Crash Report Case File Validation Queue to access the Crash Report Case File records, filtering the list of all records to only see those involving CMVs (4). The MCCA then reviews data from all sources and searches the records in the Validation Queue for a crash matching the data provided in other sources (4). The MCCA then uses the Crash Report Case File Data Entry interface to create a new, or edit an existing, record depending on if a match is found (5, see UC-C-DP-07 or UC-C-DP-08) as well as upload related data documents and associate them with the record. The record is then saved to the Crash Report Case File Repository (6).

Additional Information

One of the main external data sources the MCCA uses to receive Motor Carrier Crash Reports is the Trucking Online (TOL) Motor Carrier Online Reporting Database. The MCCA currently uses a manual process to check for and retrieve these reports. However, if possible, the proposed system should be able to regularly "ping" the TOL and automatically generate Case File records from the data accessed and/or notify the MCCA of new available Motor Carrier Crash Reports.

Within the proposed system, security trimming will need to be enforced so that only certain users can view the additional data related to Motor Carrier crash reporting within a Crash Report Case File record in order to prevent unauthorized users from accessing any PII present.

Related User Needs

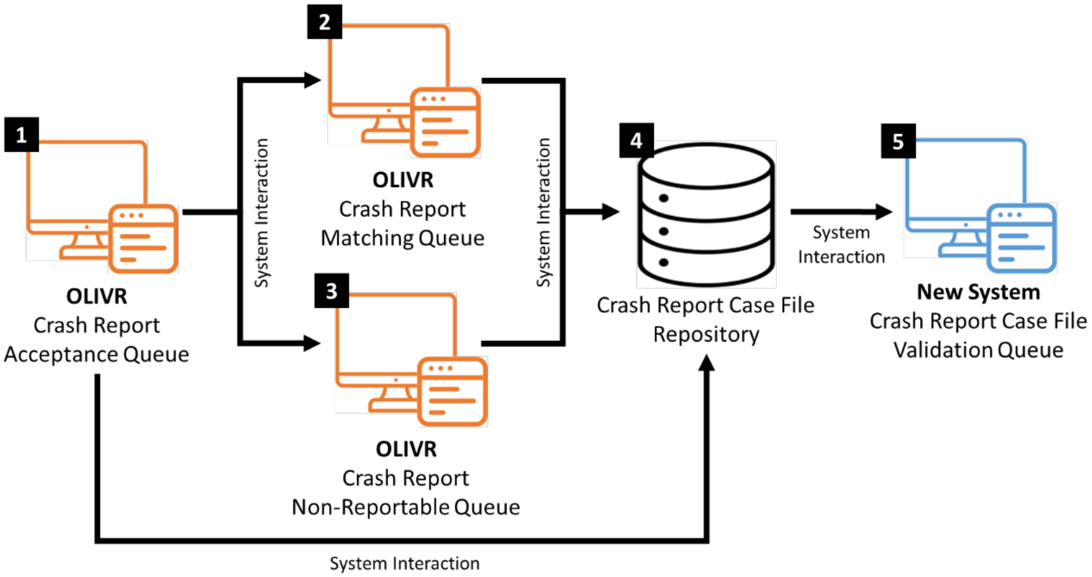
- UN-C-DP-CAR-08

5.1.2 Use Cases for Operational Scenario A

5.1.2.1 UC-A-DC-01 – Electronic Crash Report Matching

In this use case, the proposed system automatically compares various high-level data fields in the newly received crash report to the corresponding fields in the various Crash Report Case File records to find a matching record. The goal of this use case is to provide an automated way for reports to be matched and reduce the number of reports requiring manual matching. This use case differs from UC-B-DC-01 in the way that the crash report data is associated with a Crash Report Case File record.

Use Case Diagram



Use Case Description

Once an electronic crash report was reviewed for acceptance and was flagged as reportable in the Crash Report Acceptance Queue (1), the proposed system searches for a matching Crash Report Case File record in the Crash Report Matching Queue (2). If no match is found, the proposed system searches for a matching record in the Crash Report Non-Reportable Queue (3). If no match is found in either Queue, the proposed system creates a new record and enters the high-level data necessary for future matching, sets major flags as applicable, and determines and assigns a crash severity level. If a match is found in either Queue, the proposed system edits the record and reviews and updates the high-level data, reviews and sets major flags, and reviews and updates the crash severity level if necessary.

If a crash report was flagged as non-reportable in the Crash Report Acceptance Queue (1), the proposed system creates a new record and enters the high-level data necessary for future matching, sets major flags as applicable, and determines and assigns a crash severity level.

Once a record has been created or updated for the new crash report, the proposed system adds all data from the crash report to the record and saves it to the Crash Report Case File Repository (4). The record then appears in the Crash Report Case File Matching Queue (2) for future matching, or the Crash Report Case File Non-Reportable Queue (3) depending on if it was flagged as reportable or non-reportable. Reportable records also appear in the Crash Report Case File Validation Queue for further CAR Unit processing (5).

Additional Information

Further analysis will be needed to determine the following:

- Which data fields are used in the matching process, which major flags required, and which data fields are used to set them.
- When a Case File record should no longer appear in the Crash Report Case File Matching Queue and the Crash Report Case File Non-Reportable Queue.

The process in which the crash report data is associated with a Case File record will differ depending on the Operational Scenario selected. The details of this process have yet to be determined, but for Operational Scenario A this may involve multiple tables in the Crash Report Case File Repository and a corresponding primary/foreign key.

Related User Needs

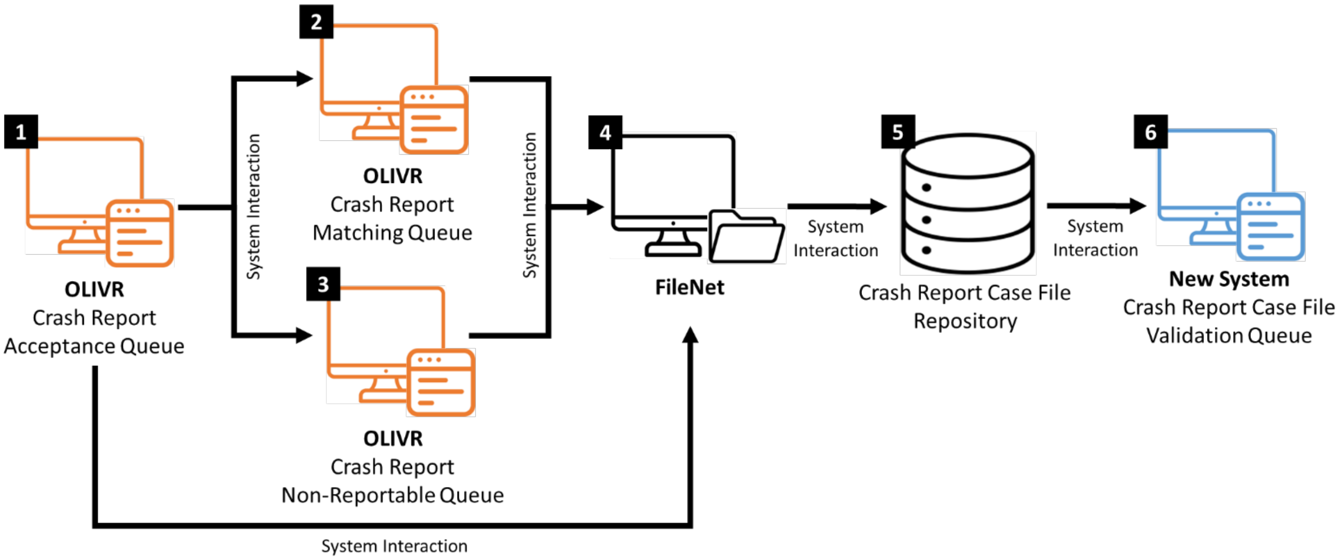
- UN-C-DC-CRU-02
- UN-C-DC-CAR-01
- UN-C-DC-CAR-03
- UN-A-DP-CAR-01
- UN-A-DP-CAR-01-01

5.1.3 Use Cases for Operation Scenario B

5.1.3.1 UC-B-DC-01 – Electronic Crash Report Matching

In this use case, the proposed system automatically compares various high-level data fields in the newly received crash report to the corresponding fields in the various Crash Report Case File records to find a matching record. The goal of this use case is to provide an automated way for reports to be matched and reduce the number of reports requiring manual matching. This use case differs from UC-A-DC-01 in the way that the crash report data is associated with a Crash Report Case File record.

Use Case Diagram



Use Case Description

Once an electronic crash report was reviewed for acceptance and was flagged as reportable in the Crash Report Acceptance Queue (1), the proposed system searches for a matching Crash Report Case File record in the Crash Report Matching Queue (2). If no match is found, the proposed system searches for a matching record in the Crash Report Non-Reportable Queue (3). If no match is found in either Queue, the proposed system creates a new record and enters the high-level data necessary for future matching, sets major flags as applicable, and determines and assigns a crash severity level. If a match is found in either Queue, the proposed system edits the record and reviews and updates the high-level data, reviews and sets major flags, and reviews and updates the crash severity level if necessary.

If a crash report was flagged as non-reportable in the Crash Report Acceptance Queue (1), the proposed system creates a new record and enters the high-level data necessary for future matching, sets major flags as applicable, and determines and assigns a crash severity level.

Once a record has been created or updated for the new crash report, the proposed system generates a PDF file using the crash report data, uploads the file to the appropriate FileNet location (4), and adds a reference to the location of the file on FileNet to the record. The proposed system then saves the record to the Crash Report Case File Repository (5). The record then appears in the Crash Report Case File Matching Queue (2) for future matching, or the Crash Report Case File Non-Reportable Queue (3) depending on if it was flagged as reportable or non-reportable. Reportable records also appear in the Crash Report Case File Validation Queue for further CAR Unit processing (6).

Additional Information

Further analysis will be needed to determine the following:

- Which data fields are used in the matching process, which major flags required, and which data fields are used to set them.
- When a Case File record should no longer appear in the Crash Report Case File Matching Queue and the Crash Report Case File Non-Reportable Queue.

The process in which the crash report data is associated with a Crash Report Case File will differ depending on the Operational Scenario selected. The details of this process have yet to be determined, but for Operational Scenario B it may involve a reference such as a URL to the PDF location in FileNet being added to the record as described in this use case.

Related User Needs

- UN-C-DC-CRU-02
- UN-C-DC-CAR-01
- UN-C-DC-CAR-03
- UN-B-DP-CRU-01
- UN-B-DP-CAR-01
- UN-B-DP-CAR-01-01

5.2 Data Processing Use Cases

This section contains the use cases for the proposed system related to the functional area of data processing. The use cases are divided between those common to both operational scenarios and those specific to each operational scenario.

Note that for all of the following use cases, security trimming should be enforced within the proposed system so certain components or interfaces are only available to certain users. Further analysis will be needed to determine permission levels.

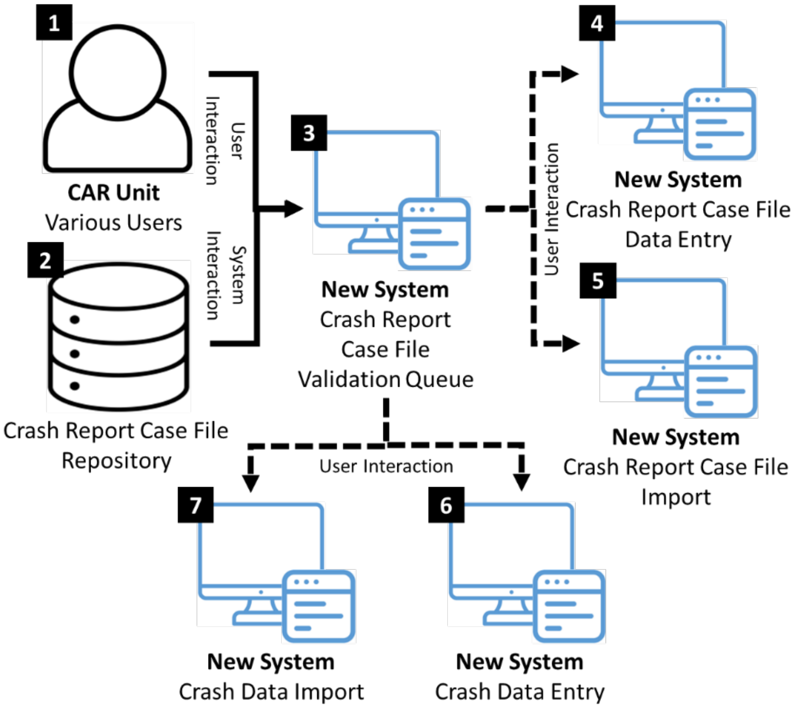
5.2.1 Common Use Cases

Below are the use cases for the proposed system common to both operational scenarios. A use case may include notes about usage pertaining to a specific operational scenario, if necessary.

5.2.1.1 UC-C-DP-01 – Access Crash Report Case File Records

In this use case, various CAR Unit staff access and view the Crash Report Case File records within the proposed system. The goal of this use case is to provide a way to easily access a single source for all data related to a Crash Report Case File from one system interface.

Use Case Diagram



Use Case Description

To access Crash Report Case File records, various CAR Unit users (1) use the Crash Report Case File Validation Queue (3), which displays a list of Case File records populated from the Crash Report Case File Repository (2). From there, users can sort the list of Case File records by various data fields and search or filter the list for various criteria. Depending on permissions, users may also:

- Validate the injury severity level indicated on a Case File record (see UC-C-DP-02), split a Case File record (see UC-C-DP-03), or create or edit Case File records (see UC-C-DP-07 or UC-C-DP-08) through the Crash Report Case File Data Entry interface (4),
- Import data to create new Case File records (see UC-C-DP-09) through the Crash Report Case File Import interface (5),
- Create or edit Crash Data records (see UC-C-DP-04, UC-A-DP-01, or UC-C-DP-05) through the Crash Data Entry interface (6), or
- Import data to create new Crash Data records (see UC-C-DP-06) through the Crash Data Import interface (7).

Additional Information

Further analysis will be needed to determine the following:

- Which data fields in the Crash Report Case File should be used to determine the level of coding readiness.
- Which data fields should be used in sort and search/filter criteria.
- When a Case File record should no longer appear in the Crash Report Case File Validation Queue.

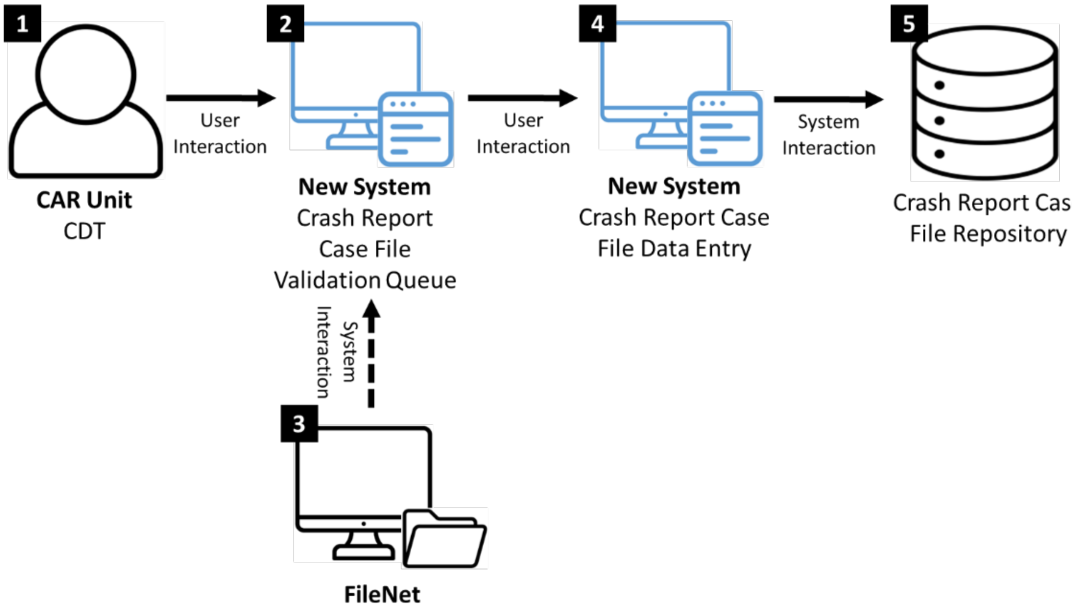
Related User Needs

- UN-C-DC-CAR-04
- UN-A-DP-CAR-02
- UN-B-DP-CAR-01

5.2.1.2 UC-C-DP-02 – Validate Crash Severity Level

In this use case, a CAR Unit CDT reviews and validates the previously assigned injury severity level in a Crash Report Case File record. The goal of this use case is to allow a CDT to update an injury severity level that may have been inaccurately assigned.

Use Case Diagram



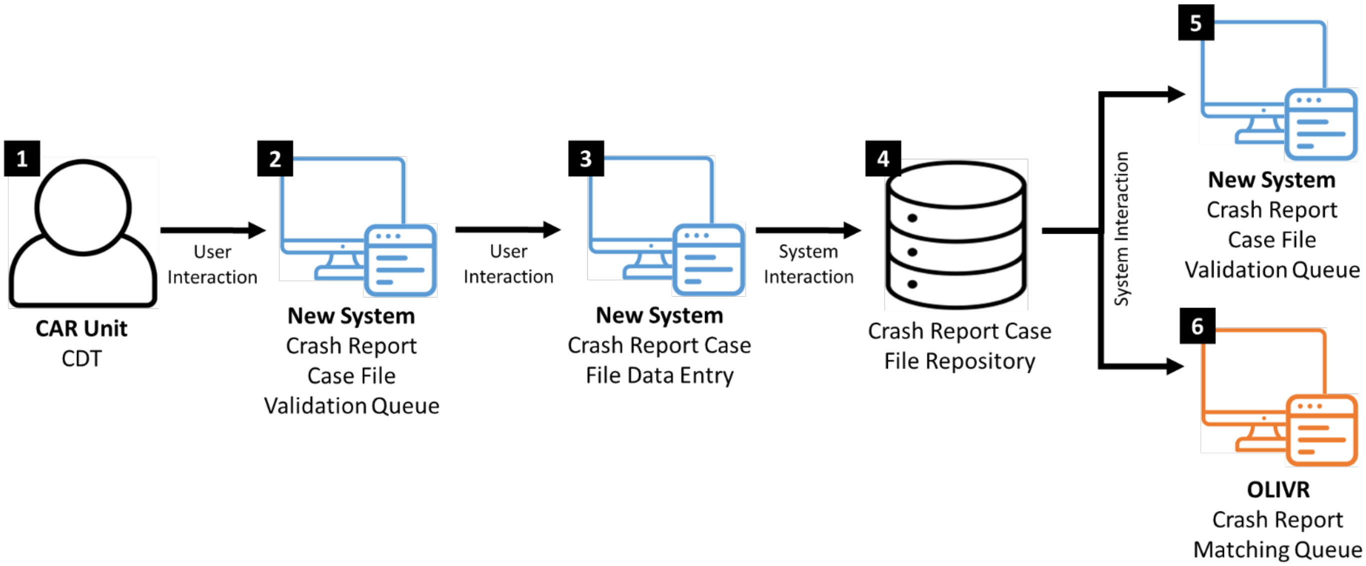
Use Case Description

The CDT (1) opens the Crash Report Case File Validation Queue (2) and sorts the list of Crash Report Case File records by injury severity, date, county, or other fields per coding best practices. The CDT then selects a record, and the proposed system displays the associated crash report data. Alternatively, if the report is imaged (for paper reports in both Operational Scenarios) or generated (for electronic reports in Operational Scenario B, the proposed system opens the corresponding crash report file(s) in FileNet (3). The CDT then analyzes the crash report data, comparing it against the assigned injury severity level. If the injury severity level previously assigned is accurate, no further action is needed. If it is inaccurate, the CDT edits the record using the Crash Report Case File Data Entry interface (4) and updates the injury severity level as necessary. The record is then saved in the Crash Report Case File Repository (5).

5.2.1.3 UC-C-DP-03 – Split a Crash Report Case File

In this use case, a CAR Unit CDT splits a Crash Report Case File record into one or more new records. The goal of this use case is to allow a record to be split in the event that crash reports were incorrectly matched.

Use Case Diagram



Use Case Description

The CDT (1) opens the Crash Report Case File Validation Queue (2) and searches for and selects the Crash Report Case File record they wish to split. The CDT then opens the Crash Report Case File Data Entry interface (3) and re-assigns an associated crash report file by creating a new record, entering high-level data, setting major flags as necessary, and assigning an injury severity level, before associating the crash report file with the new record. All records are then saved to the Crash Report Case File Repository (4). The updated records appear in both the Crash Report Case File Validation Queue (5) and the Crash Report Matching Queue (6) for future matching.

If a record contains an imaged (for paper reports in both Operational Scenarios) or a generated crash report (for electronic reports in Operational Scenario B), the proposed system adds the reference to the file on FileNet to the new record.

Additional Information

The method in which the association of a crash report to a Crash Report Case File is changed will depend on Operational Scenario chosen for implementation.

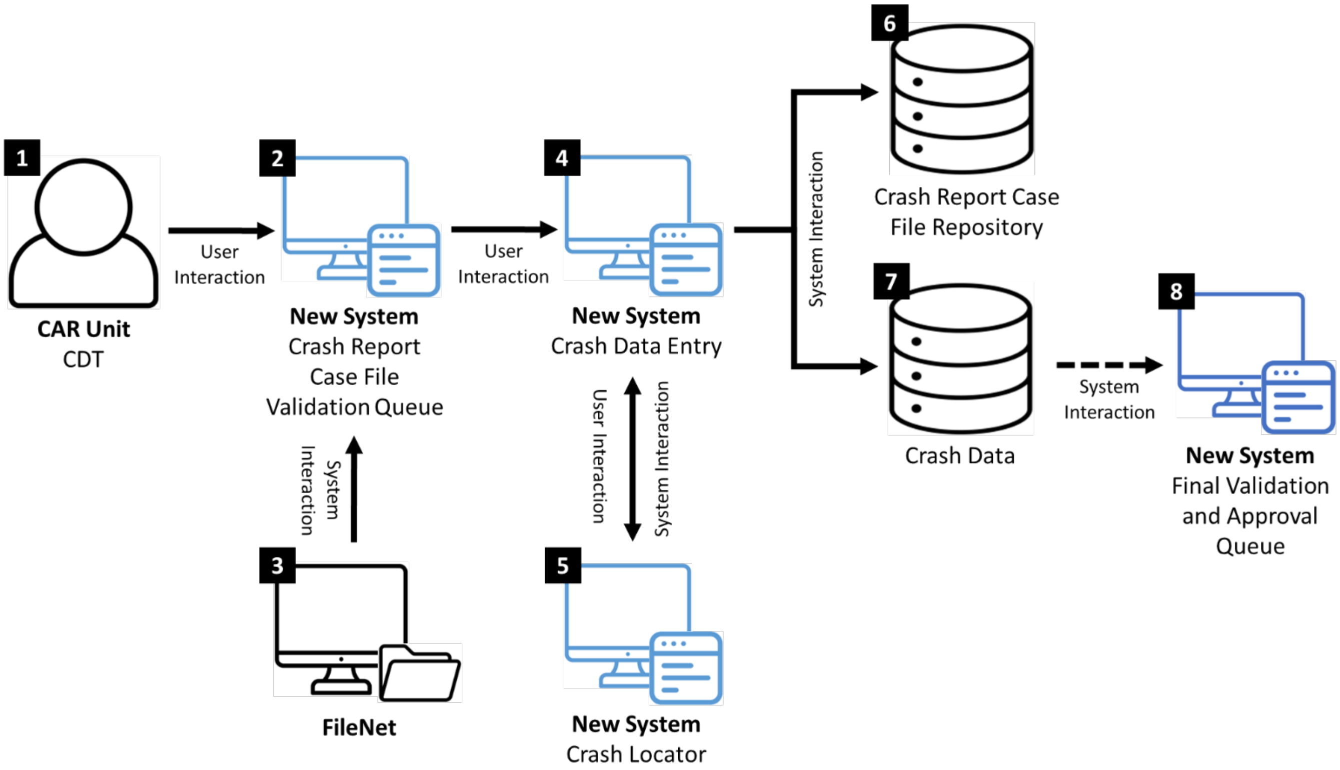
Related User Needs

- UN-C-DC-CAR-04
- UN-C-DC-CR-04-01

5.2.1.4 UC-C-DP-04 – Create a New Crash Data Record

In this use case, a CAR Unit CDT creates a new Crash Data record. The goal of this use case is to provide a way to easily create new records by reviewing generated or imaged crash report PDF files and entering data into a new record within a single system. This use case applies to paper crash reports for Operational Scenario A and all crash reports for Operational Scenario B. See UC-A-DP-01 for a use case regarding electronic crash reports for Operational Scenario A.

Use Case Diagram



Use Case Description

A CDT (1) opens the Crash Report Case File Validation Queue (2), and the proposed system displays a list of all Crash Report Case File records, each with an indicator showing how ready a Case File record is to be coded. The CDT selects a Case File record and creates a Crash Data record. The proposed system opens the corresponding crash report(s) in FileNet (3) and displays a Crash Data Entry interface (4) in which the CDT enters basic crash data. The CDT also adds a crash location using the Crash Locator interface (5, see UC-C-DP-04-01). Once the proposed system has imported the crash location data, the CDT continues to analyze the crash report and code and enter additional crash data (4). If the CDT has finished all necessary coding and data entry, the CDT saves the data, and the system runs it against various validation rules. If validation warning or errors arise, the proposed system returns the corresponding messages to the CDT. The CDT addresses the issues and saves again. If no errors arise, the proposed system sets a status field in the Crash Data record indicating the record is awaiting approval by the system through the Final Validation and Approval Queue and saves both the Case File record and the Crash Data record to the appropriate databases (6, 7). The record then appears in the Final Validation and Approval Queue (8).

The CDT may alternatively save the data as in-progress once all basic required crash data has been entered. In that case, the proposed system sets a status field in the Crash Data record indicating the record is in-progress and saves both the Case File record and the Crash Data record to the appropriate databases (6, 7).

Additional Information

Further analysis will be needed to determine the which validation rules will run in-line as CDTs fill in data, which run upon saving the data, and which occur during final validation and approval.

Related User Needs

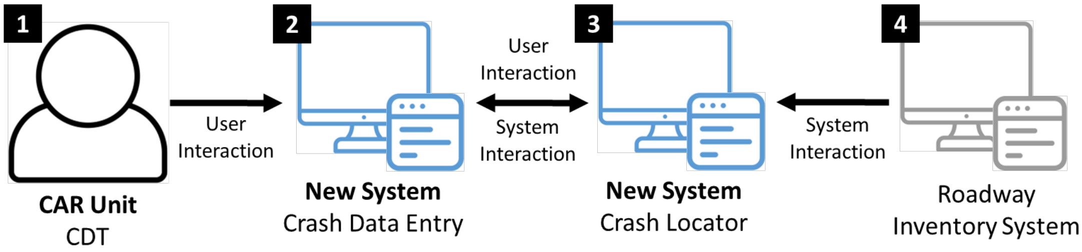
- UN-C-DP-CAR-04
- UN-C-DP-CAR-04-01
- UN-C-DP-CAR-06

- UN-C-DP-CAR-06-02
- UN-C-DP-CAR-07

5.2.1.5 UC-C-DP-04-01 – Add Crash Location

In this use case, a CAR Unit CDT uses an interactive map-based tool to locate a crash. The goal of this use case is to allow a CDT to easily locate a crash based on information provided in the crash report and add geospatial data directly to the Crash Data record. This use case applies to all crash reports where no, or inaccurate, geospatial location data has been submitted as part of the report.

Use Case Diagram



Use Case Description

Once the CDT (1) has entered the basic crash data required for a Crash Data record in the Crash Data Entry interface (2), the CDT locates a crash using the interactive map-based Crash Locator Interface (3). Once the CDT pinpoints the crash location, the proposed system prompts the CDT to select the correct roadway. Once the CDT selects the roadway, the proposed system imports the location data, and other related descriptive data such as County, Region, City, etc., into the corresponding data fields in the Crash Data Entry interface, pulling necessary data from the Roadway Inventory System (4). The CDT then proceeds with the remaining steps in the coding process (see UC-C-DP-04 or UC-A-DP-01).

Additional Information

The Crash Locator interface should have the ability to import geospatial and descriptive location data.

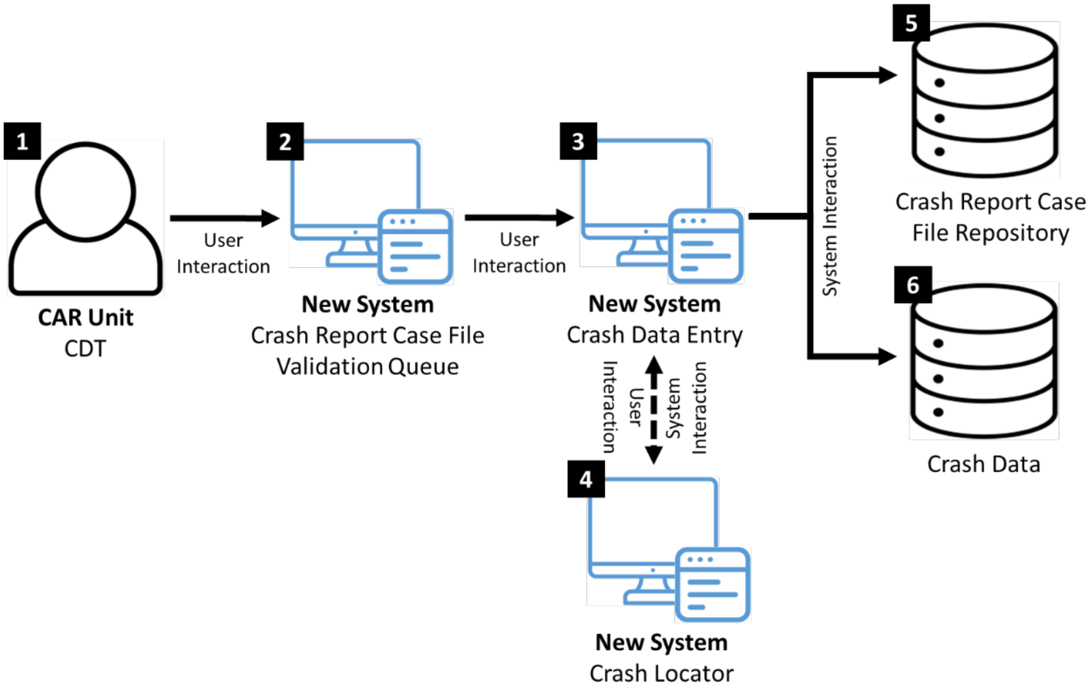
Related User Needs

- UN-C-DP-CAR-05
- UN-C-DP-CAR-05-01
- UN-C-DP-CAR-05-02

5.2.1.6 UC-C-DP-05 – Edit Crash Data Record

In this use case, a CAR Unit CDT edits a Crash Data record. The goal of this use case is to allow CDTs to be able to update a record if new data is received, or to resume coding a record that had been saved previously.

Use Case Diagram



Use Case Description

The CDT (1) opens the Crash Report Case File Validation Queue (2) and searches for the Crash Report Case File record with the corresponding Crash Data record needing edits. The CDT then selects the Case File record and edits the crash data as necessary using the Crash Data Entry interface (3). The CDT may also update the crash location using the Crash Locator interface (4). If the CDT has finished all necessary coding and data entry, the CDT saves the data, and the proposed system runs it against various validation rules. If validation warnings or errors arise, the proposed system returns the appropriate messages to the CDT. The CDT addresses the issues and saves again. If no errors arise, the proposed system sets a status field in the Crash Data record indicating the record is awaiting approval by the system through the Final Validation and Approval Queue and saves both the Case File record and the Crash Data record to the appropriate databases (5, 6).

The CDT may alternatively save the data as in-progress once all basic required crash data has been entered. In that case, the proposed system sets a status field in the Crash Data record indicating the record is in-progress and saves both the Case File record and the Crash Data record to the appropriate databases (5, 6).

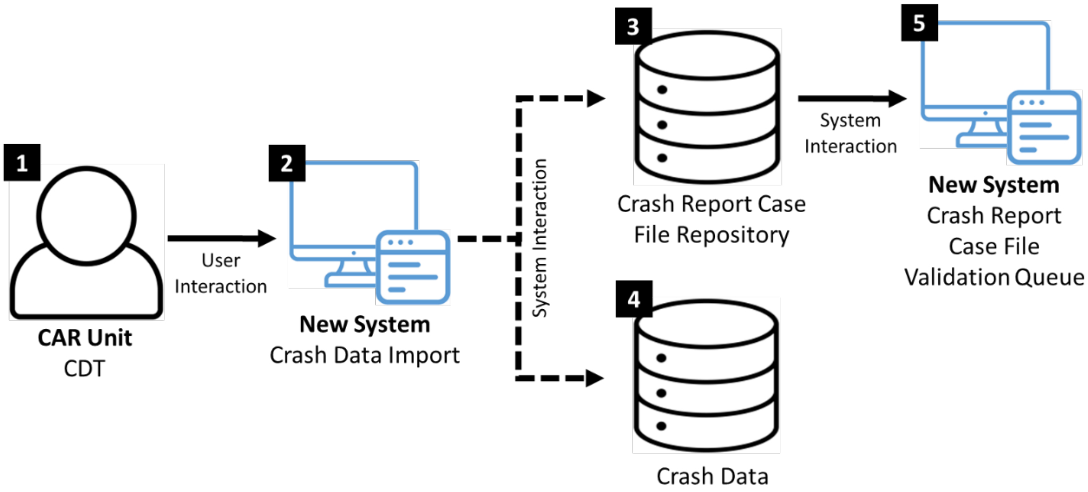
Related User Needs

See UC-C-DP-04 for user needs related to this use case.

5.2.1.7 UC-C-DP-06 – Import Crash Data Records

In this use case, a CAR Unit CDT creates Crash Data records by importing coded data in an alternate format such as tabular data in a spreadsheet. The goal of this use case is to allow the CDTs to import data they have coded outside of the system in the event of a system outage in order to prevent additional manual data entry once the system has been restored, or a non-CDS user (contractor/university) is providing data to support crash coding timeliness objectives.

Use Case Diagram



Use Case Description

The CDT (1) uses the Crash Data Import interface (2) to upload a file containing coded crash data. The proposed system extracts the data from the file and searches the Crash Report Case File Repository (3) for a Case File record that matches the high-level data in the file. If a match is not found, the proposed system returns an error message. Otherwise, if a match is found, the proposed system creates a new Crash Data record and adds the extracted data to the corresponding data fields in the record. The proposed system then associates the Crash Data record with the matching Case File record and sets a status field in the Crash Data record indicating the record is in-progress. The proposed system then saves both the Case File and Crash Data records (3, 4). The updated Case File record then appears in the Crash Report Case File Validation Queue (5). The proposed system then displays either a success or error message. The CDT can then edit the Crash Data record to add crash location data (see UC-C-DP-05).

Additional Information

The Crash Data Import interface must be able to process multiple file formats, such as PDFs or Excel files. The proposed system must also be able to process multiple files at a time, and multiple lines per file in the case of Excel files.

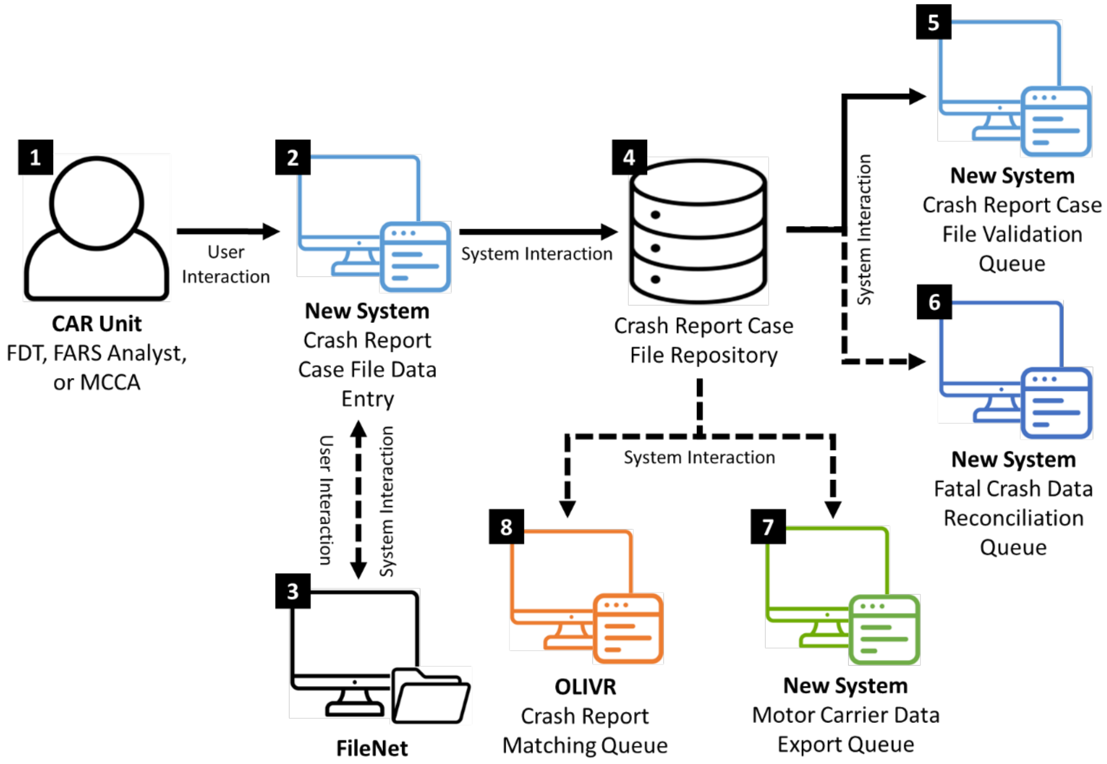
Related User Needs

- UN-C-DP-CAR-04-02

5.2.1.8 UC-C-DP-07 – Create Crash Report Case File Record with Additional Crash Data

In this use case, the CAR Unit FDT, FARS Analyst, or MCCA creates a new Crash Report Case File record and codes and enters additional data for fatal or CMV crash tracking and federal reporting purposes. The goal of this use case is to allow users to code and enter all data related to a single crash event in a single record and mitigate the current need for multiple Crash Report Case Files across disparate systems for the same crash event.

Use Case Diagram



Use Case Description

The FDT, FARS Analyst, or MCCA (1), collectively referred to as "user" in this use case description, creates a new Crash Report Case File record using the Crash Report Case File Data Entry interface (2). The user enters high-level data for future matching, sets major flags as applicable, and assigns an injury severity level. The proposed system also creates either a Fatal Crash Reporting record or CMV Crash Reporting record into which the user codes and enters additional data for tracking and/or federal reporting purposes. The user may also upload related data files gathered or received previously if necessary. The proposed system uploads these files to the appropriate FileNet location (3) and adds references to the locations on FileNet to the Case File record. If the user has completed all necessary coding for FARS or Motor Carrier reporting requirements, the user saves the data, and the system runs it against various validation rules. If validation warnings or errors arise, the proposed system returns the appropriate messages to the user. The user corrects the data as necessary and saves again. If no errors arise the proposed system sets a status field in either the Fatal Crash Reporting record or CMV Crash Reporting record indicating the record is either awaiting fatal crash data reconciliation or awaiting final approval. All records are then saved to the Crash Report Case File Repository (4). All Case File records then appear in the Crash Report Case File Validation Queue (5), Case File records indicating a fatality appear in the Fatal Crash Data Reconciliation Queue (6), and Case File records indicating CMV involvement appear in the Motor Carrier Data Export Queue (7).

The user may alternatively save the data as in-progress once all high-level required data has been entered. In that case, the proposed system sets a status field in either the Fatal Crash Reporting record or CMV Crash Reporting record indicating the record is in-progress and saves all records to the Crash Report Case File Repository (4).

The new Case File record also appears in the Crash Report Matching Queue (8) for future crash report matching.

Additional Information

Further analysis will be needed to determine the following:

- The validation rules records should be run against in the new system, as the rules will differ based on the type (fatal or CMV) of additional data being entered, as well as pass/fail conditions and warning/error messages.
- The process to associate additional raw data for fatal or CMV reporting purposes with a Crash Report Case File record.
- The process to associate additional data files may be associated with a Crash Report Case File record, though the process should be the same or similar to the process selected for imaged or generated crash reports (see UC-C-DP-04 or UC-B-DC-01).

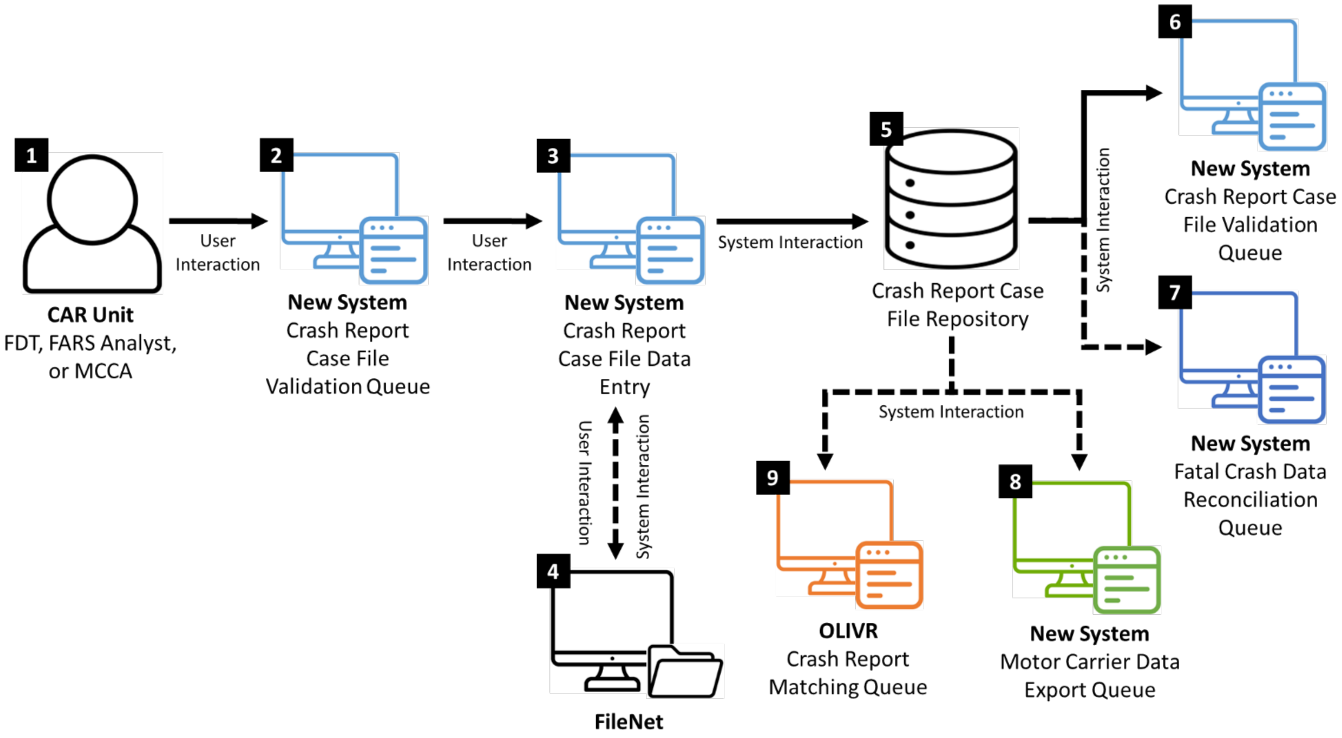
Related User Needs

- UN-C-DC-CAR-04
- UN-C-DI-CAR-09
- UN-C-DI-CAR-09-01

5.2.1.9 UC-C-DP-08 – Edit Crash Report Case File Record with Additional Crash Data

In this use case, the CAR Unit FDT, FARS Analyst, or MCCA edits a Crash Report Case File record to add or update additional data for fatal or CMV crash tracking and federal reporting purposes. The goal of this use case is to allow users to add or update data as necessary as new data is gathered or received from a variety of sources.

Use Case Diagram



Use Case Description

The FDT, FARS Analyst, or MCCA (1), collectively referred to as "user" in this use case description, searches for a Crash Report Case File record using the Crash Report Case File Validation Queue (2) and edits it using the Crash Report Case File Data Entry interface (3). The user updates high-level data for future matching, sets major flags as applicable, and updates the injury severity if necessary. The user updates or codes and enters additional data in the associated Fatal Crash Reporting record or the CMV Crash Reporting record for tracking and/or federal reporting purposes. The user may also upload related data files gathered or received previously if necessary. The proposed system uploads these files to the appropriate FileNet location (4) and adds references to the locations on FileNet to the Case File record. If the user has completed all necessary coding for FARS or Motor Carrier reporting requirements, the user saves the data, and the proposed system runs it against various validation rules. If validation warnings or errors arise, the proposed system returns the appropriate messages to the user. The user addresses the issues and saves again. If no errors arise the proposed system sets a status flag in either the Fatal Crash Reporting record or CMV Crash Reporting record indicating the record is either awaiting fatal crash data reconciliation or awaiting final approval. All records are then saved to the Crash Report Case File Repository (5). All Case File records then appear in the Crash Report Case File Validation Queue (6), Case File records indicating a fatality appear in the Fatal Crash Data Reconciliation Queue (7), and Case File records indicating CMV involvement appear in the Motor Carrier Data Export Queue (8).

The user may alternatively save the data as in-progress once all high-level required data has been entered. In that case, the proposed system sets a status field in either the Fatal Crash Reporting record or CMV Crash Reporting record indicating the record is in-progress and saves all records to the Crash Report Case File Repository (5).

Additional Information

See UC-C-DP-07 for additional information related to this use case.

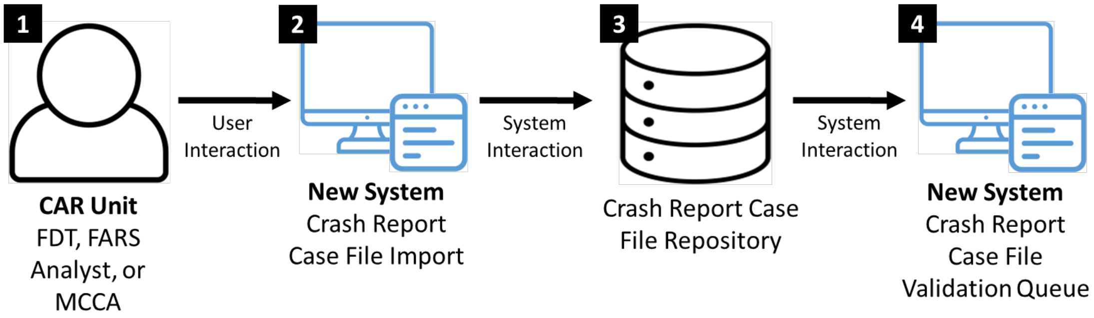
Related User Needs

See UC-C-DP-07 for user needs related to this use case.

5.2.1.10 UC-C-DP-09 – Import Crash Report Case File Records with Additional Crash Data

In this use case, the CAR Unit FDT, FARS Analyst, or MCCA creates or updates Crash Report Case File records by importing coded data in an alternate format. The goal of this use case is to allow users to import data they have coded outside of the system in the event of a system outage, in order to prevent additional manual data entry once the system has been restored.

Use Case Diagram



Use Case Description

The FDT, FARS Analyst, or MCCA (1), collectively referred to as “user” in this use case description, uses the Crash Report Case File Import interface (2) to upload a file containing coded data for fatal or CMV tracking and/or federal reporting purposes. The proposed system extracts the data from the file and searches the Crash Report Case File Repository (3) for a Case File record that matches the high-level data in the file. If a match is not found, the proposed system returns an error message. Otherwise, if a match is found, the proposed system creates either a Fatal Crash Reporting record or CMV Crash Reporting record and adds the extracted data to the corresponding data fields. The proposed system then sets a status field in either a Fatal Crash Reporting record or CMV Crash Reporting record indicating the record is in-progress and associates the record with the corresponding Case File record. The proposed system then saves all records to the Crash Report Case File Repository (3). The updated Case File record then appears in the Crash Report Case File Validation Queue (4). The proposed system then displays either a success or error message. The user can then edit the Case File record to upload any additional related data files if necessary or validate and save the data (see UC-C-DP-08).

Additional Information

The Crash Report Case File Record Import component must be able to process multiple file formats, such as PDFs or Excel files. The proposed system must also be able to process multiple files at a time, and multiple lines per file in the case of Excel files.

Related User Needs

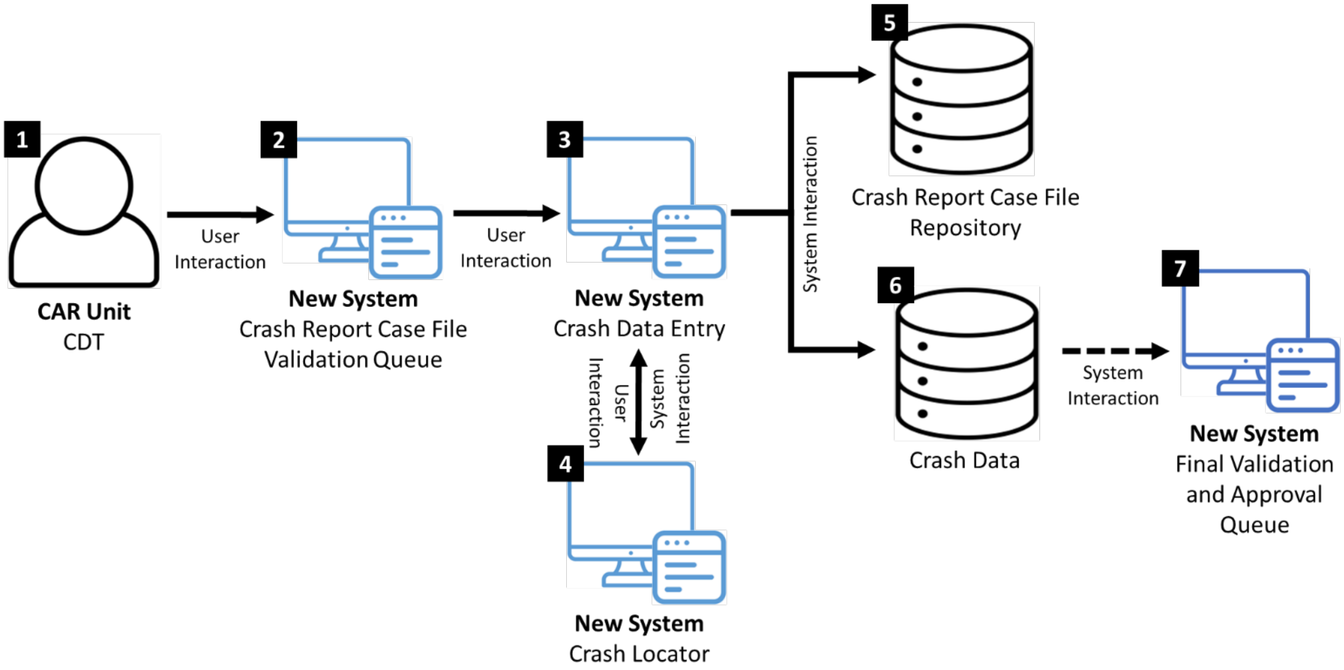
- UN-C-DI-CAR-04-02

5.2.2 Use Cases for Operational Scenario A

5.2.2.1 UC-A-DP-01 – Create a New Crash Data Record

In this use case, a CAR Unit CDT creates a new Crash Data record. The goal of this use case is to provide a way to easily create new records by importing basic crash data and any geospatial location data from a Crash Report Case File record into a new Crash Data record within a single system. This use case applies to electronic crash reports for Operational Scenario A.

Use Case Diagram



Use Case Description

A CDT (1) navigates to the Crash Report Case File Validation Queue (2) and the proposed system displays a list of all Crash Report Case File records, each with an indicator showing how ready a Case File record is to be coded. The CDT selects a Case File record and creates a Crash Data record using the Crash Data Entry interface (3) into which the basic crash data, including any location data, has been imported. The CDT then uses the Crash Locator interface (4) to validate the crash location if one was provided in the crash report (see UC-A-DP-01-01), or add a new crash location (see UC-C-DP-04-01). Once the crash location has been validated or added, the CDT continues to analyze the crash report to code and enter additional crash data (3). If the CDT has finished all necessary coding and data entry, the CDT saves the data, and the proposed system runs it against various validation rules. If validation warnings or errors arise, the proposed system returns the appropriate messages to the CDT. The CDT addresses the issues and saves again. If no errors arise, the proposed system sets a status field in the Crash Data record indicating the record is awaiting approval by the system through the Final Validation and Approval Queue and saves both the Case File record and the Crash Data record to the appropriate databases (5, 6). The record then appears in the Final Validation and Approval Queue (7).

The CDT may alternatively save the data as in-progress once all basic required crash data has been entered. In that case, the proposed system sets a status field in the Crash Data record indicating the record is in-progress and saves both the Case File record and the Crash Data record to the appropriate databases (5, 6).

Additional Information

Further analysis will be needed to determine the which validation rules will run in-line as CDTs fill in data, which run upon saving the data, and which occur during final validation and approval.

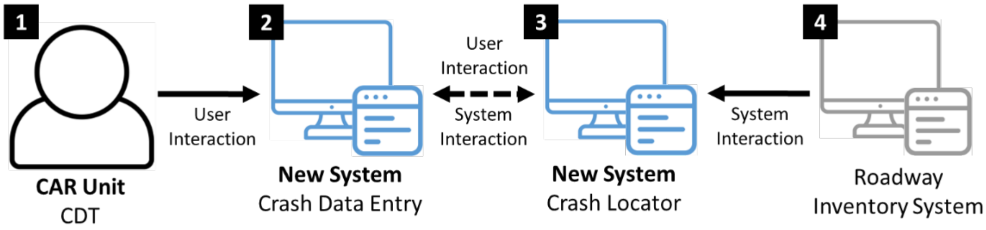
Related User Needs

- UN-C-DI-CAR-04
- UN-C-DI-CAR-04-01
- UN-A-DI-CAR-01
- UN-A-DI-CAR-01-01

5.2.2.2 UC-A-DP-01-01 – Validate Crash Location

In this use case, a CAR Unit CDT validates geospatial crash location data that was submitted along with a crash report. The goal of this use case is to allow CDTs to review the geospatial location though an interactive, map-based interface and correct it if necessary.

Use Case Diagram



Use Case Description

Once the CDT (1) has created a new Crash Data record and the proposed system has imported the basic crash data, including location data, into the Crash Data Entry interface (2), the CDT validates the imported crash location using the interactive map-based Crash Locator interface (3) by comparing the pinpoint location on the map to the descriptive location in the crash report data. If the pinpoint location is accurate, the CDT indicates as such and the proposed system prompts the CDT to select the correct roadway, pulling necessary data from the Roadway Inventory System (4). Once the CDT selects the roadway, the proposed system imports the additional location data into the corresponding data fields in the Crash Data Entry interface. The CDT then proceeds with the remaining steps in the coding process (see UC-A-DP-01). If the location is note accurate, the user removes the pinpoint location and proceeds to add a new crash location (see UC-C-DP-04-01).

Additional Information

The Crash Locator interface should have the ability to import geospatial and descriptive location data.

Related User Needs

See UC-C-DP-04-01 for user needs related to this use case.

5.3 Data QA/QC Use Cases

This section contains the use cases for the proposed system related to the functional area of data quality assurance/quality control (QA/QC). All use cases apply to the proposed system regardless of operational scenario.

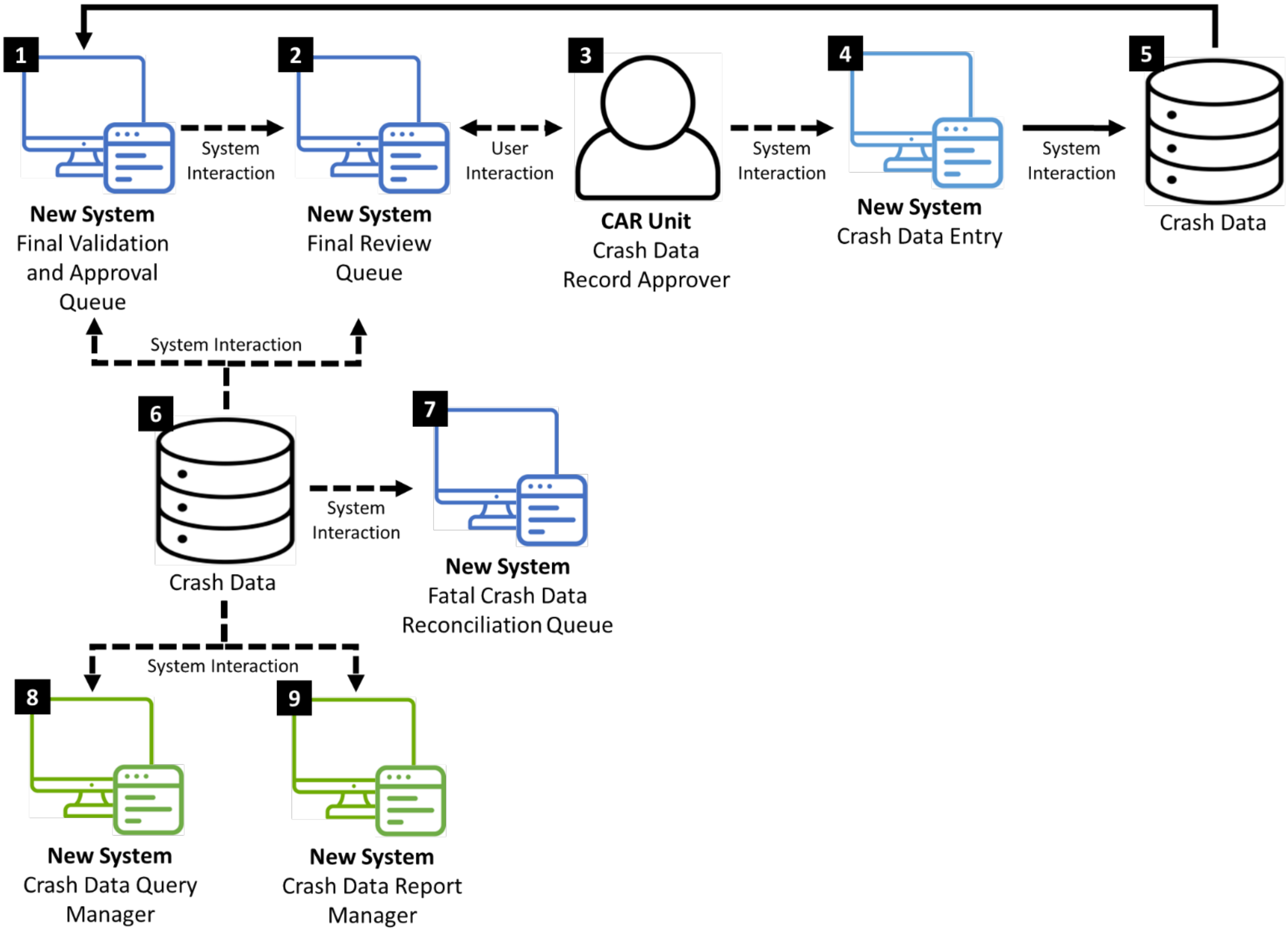
Note that for all of the following use cases, security trimming should be enforced within the proposed system so certain components or interfaces are only available to certain users. Further analysis will be needed to determine permission levels.

5.3.1 Common Use Cases

5.3.1.1 UC-C-DQ-01 – Final Crash Data Record Validation and Approval

In this use case, Crash Data records will undergo final validation and approval prior to being released for distribution and reporting. The goal of this use case is to provide a way to perform more regular, automated QA/QC on crash data and speed up the data review and approval process and the overall release of the data.

Use Case Diagram



Use Case Description

Once a Crash Data record has passed initial validation and been saved it appears in the Final Validation and Approval Queue (1). Nightly, the proposed system runs a variety of queries/validation rules on the records for additional QA/QC. If a record fails, it appears in the Final Review Queue (2). Daily, the user with a crash data record approver role (3) reviews records in the Final Review Queue. If a record requires corrections, the CDT Team Lead edits the data as necessary, then validates and saves the record using the Crash Data Entry interface (4). If no validation errors arise, the record is saved to the Crash Data database (5, see UC-C-DP-05 for a more detailed process description). The record then appears in the Final Validation and Approval Queue (1) and will be run through final validation on the next nightly run. If the CDT Team Lead determines the record does not require corrections, the CDT Team Lead sets a status field in the record indicating final approval and the proposed system saves it to the Crash Data database (6).

If a record passes final validation, the proposed system sets a status field in the record indicating final approval and saves it to the Crash Data database (6). If the record indicates a fatality, the record appears in the Fatal Crash Data Reconciliation Queue (7). Otherwise, the record appears for use in the Crash Data Query Manager (8) and the Crash Data Report Manager (9).

Additional Information

Further analysis will be needed to determine the which validation rules will run in-line as CDTs fill in data, which run upon saving the data, and which occur during final validation and approval.

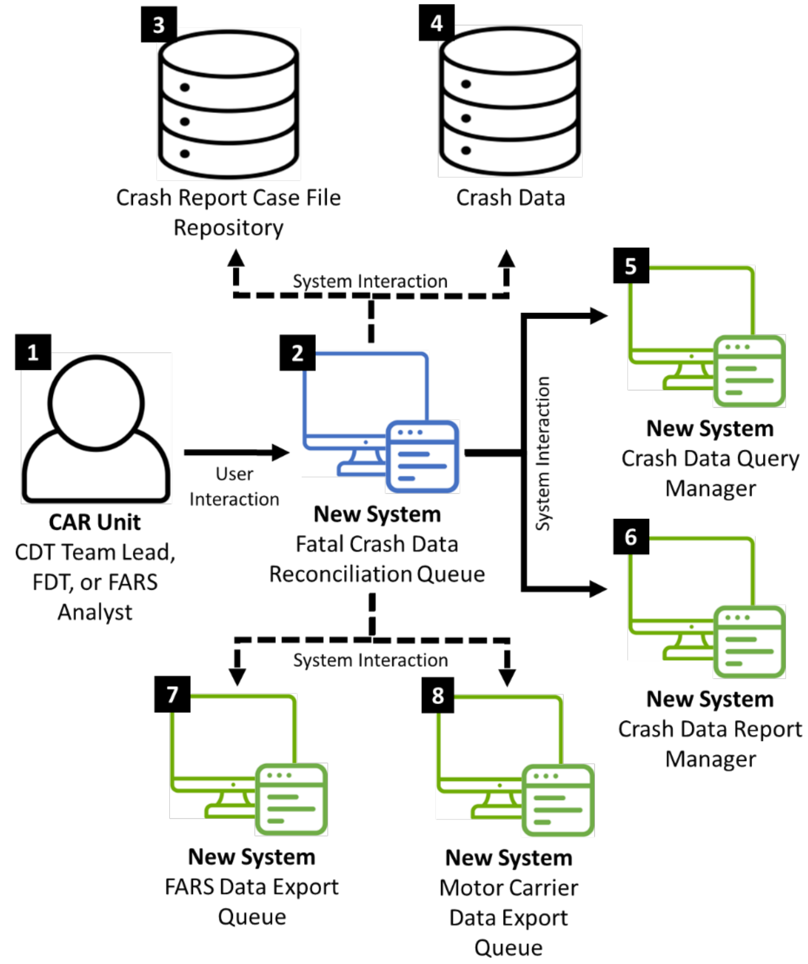
Related User Needs

- UN-C-DQ-CAR-01

5.3.1.2 UC-C-DQ-02 – Fatal Crash Data Reconciliation

In this use case, the CDT Team Lead, FDT, or FARS Analyst identifies differences between fatal crash data captured in Crash Data records by CDTs and Crash Report Case File records by the FDT, FARS Analyst, or MCCA (for fatal CMV crashes). The goal of this use case is to identify differences in the two data sources to either correct or accept prior to release for distribution or export.

Use Case Diagram



Use Case Description

On a regular basis the CDT Team Lead, FDT, or FARS Analyst (1), collectively referred to as "user" in this use case description, uses the Fatal Crash Reconciliation Queue (2) to initiate the fatal crash data comparison process in which the proposed system compares various key data field values for differences between Fatal Crash

Reporting records in the Crash Report Case File Repository (3) and Crash Data records in the Crash Data database (4). If the proposed system identifies differences that require correction, the user edits the data as needed (see UC-C-DP-05 or UC-C-DP-08). If the proposed system identifies differences that do not require correction, the user sets a status field in each record indicating final approval, and the Crash Data records are then available for use in the Crash Data Query Manager (5) and Crash Data Report Manager (6). The Fatal Crash Reporting records also appear in the FARS Data Export Queue (7) and the Motor Carrier Data Export Queue (8).

If the proposed system does not identify any differences, the proposed system sets a status field in each record indicating final approval and the Crash Data records are then available for use in the Crash Data Query Manager (5) and Crash Data Report Manager (6). The Fatal Crash Reporting records also appear in the FARS Data Export Queue (7) and the Motor Carrier Data Export Queue (8).

Additional Information

Further analysis is needed to determine which data fields require comparison as well as pass/fail conditions.

Related User Needs

- UN-C-DQ-CAR-02

5.4 Data Distribution and Reporting Use Cases

This section contains the use cases for the proposed system related to the functional area of data distribution and reporting. All use cases apply to the proposed system regardless of operational scenario.

Note that for all of the following use cases, security trimming should be enforced within the proposed system so certain components or interfaces are only available to certain users. Further analysis will be needed to determine permission levels.

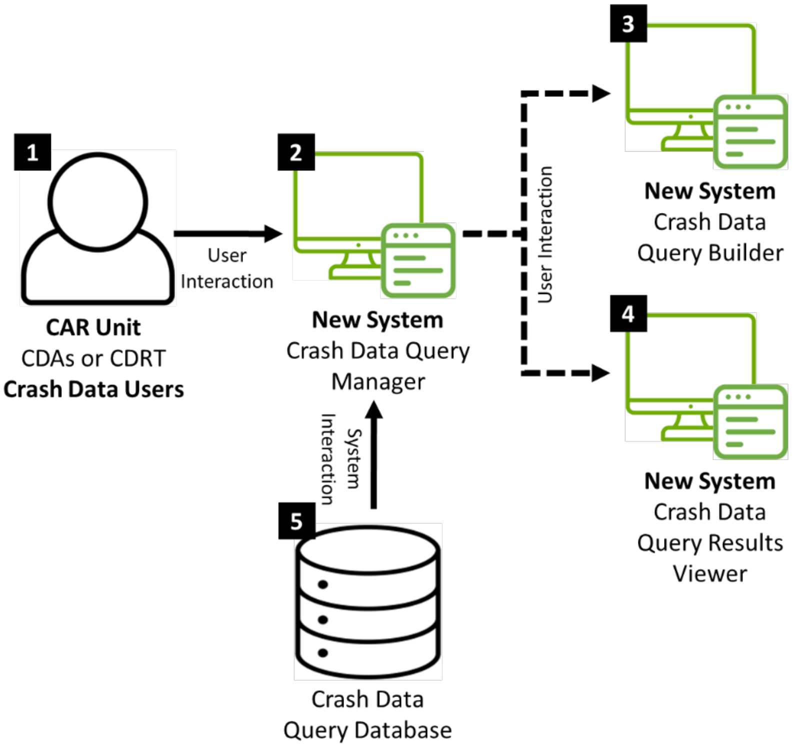
5.4.1 Common Use Cases

5.4.1.1 UC-C-DD-01 – Manage Crash Data Queries

In this use case, a Crash Data Analyst (CDA) or Crash Data Report Technician (CDRT) manages a library of all crash data queries. The goal of this use case is to provide a single location for all query management regardless of complexity, eliminating the need to rely on third-party applications to create and run more complex queries.

In addition, this use case may also apply in part to crash data users internal and external to ODOT.

Use Case Diagram



Use Case Description

To view and manage data queries, a CDA, CDRT, or a crash data user (1), collectively referred to as "user" in this use case description, opens the Crash Data Query Manager (2). From there, the user can sort the list of queries by various data fields and search or filter the list for various criteria. Users may also:

- Create or edit data queries (see UC-C-DD-01 or UC-C-DD-02) through the Crash Data Query Builder (3).
- Run queries and view results in a variety of formats (see UC-C-DD-03) using the Crash Data Query Results Viewer (4).

Data queries are stored in a Crash Data Query database (5).

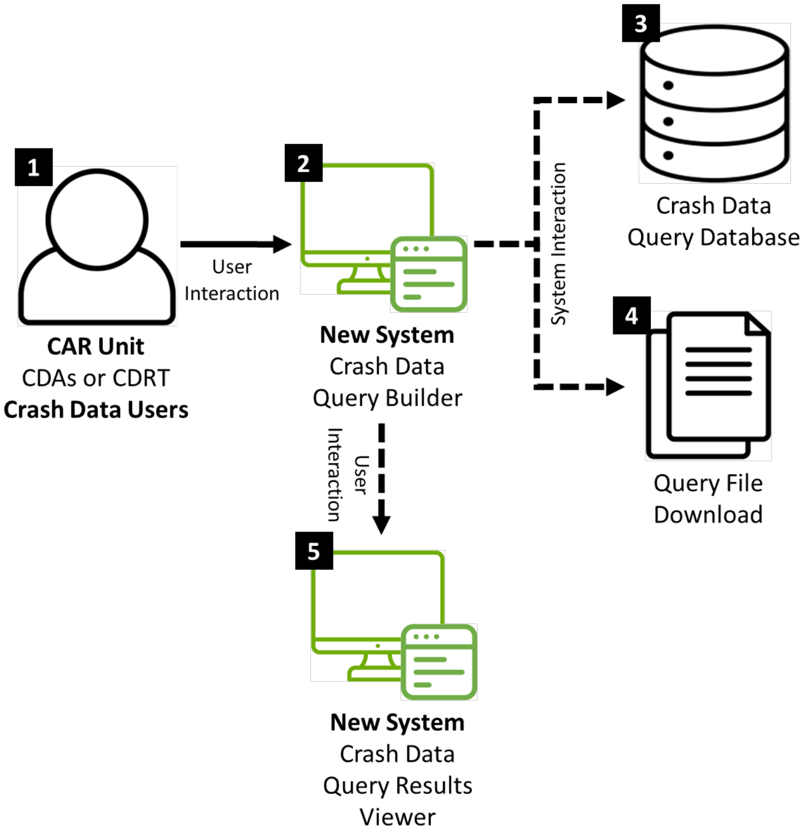
Related User Needs

- UN-C-DD-DU-01
- UN-C-DD-DU-01-01
- UN-C-DD-DU-01-02
- UN-C-DD-DU-01-03

5.4.1.2 UC-C-DD-02 – Create a Crash Data Query

In this use case, a CDA, CDRT, or a crash data user creates a new crash data query. The goal of this use case is to allow users to easily create new queries using various query building options depending on the complexity of the query in order to fulfill crash data requests or for use in conjunction with data reports.

Use Case Diagram



Use Case Description

A CDA, CDRT (1), or a crash data user, collectively referred to as "user" in this use case description, uses the Crash Data Query Builder (2) to create new crash data queries. The user may use the simple builder interface within the component to construct the query, or type query statements directly for more complex queries. The proposed system saves the new query to the Crash Data Query database (3), or the user may choose to download a query statement file. The user may also choose to run the query and view results in a variety of formats using the Crash Data Results Viewer (4).

Additional Information

Further analysis is needed to determine the following:

- If crash data users should be able to save a query to the Crash Data Query database or if they should be limited to downloading query statement files.
- The validation rules needed on directly entered queries, such as prohibiting “drop” and “delete” statements.

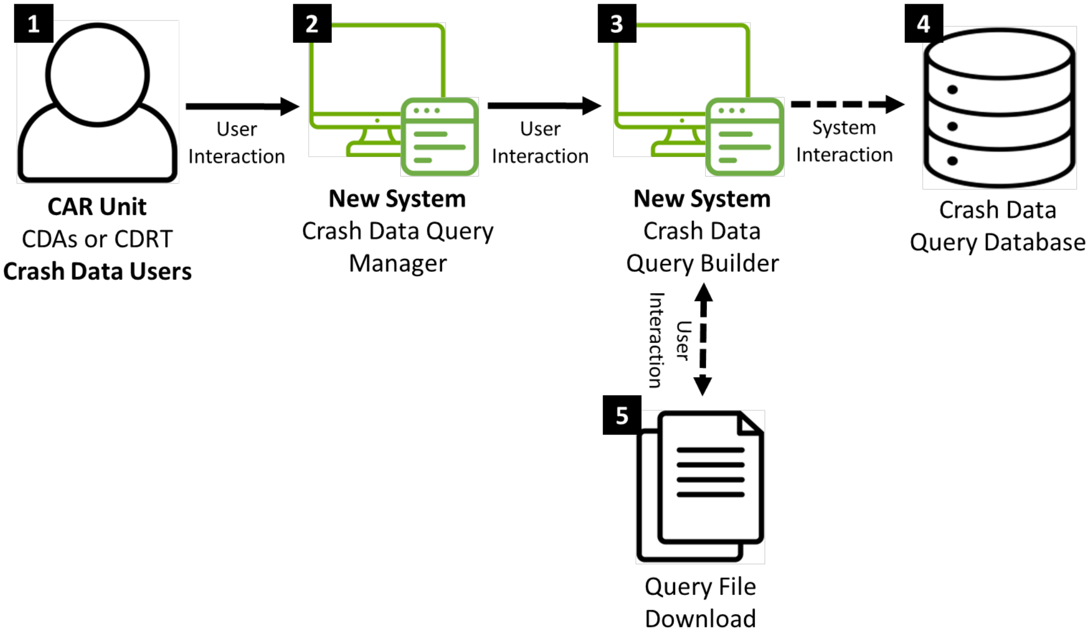
Related User Needs

- UN-C-DD-CAR-01
- UN-C-DD-CAR-01-01
- UN-C-DD-CAR-01-02
- UN-C-DD-CAR-01-03

5.4.1.3 UC-C-DD-03 – Edit a Crash Data Query

In this use case, a CDA, CDRT, or a crash data user edits a crash data query. The goal of this use case is to allow users to easily edit queries using various query building options depending on the complexity of the query in order to fulfill crash data requests or for use in conjunction with data reports.

Use Case Diagram



Use Case Description

A CDA, CDRT (1), or a crash data user, collectively referred to as "user" in this use case description, searches for a crash data query they wish to edit using the Crash Data Query Manager (2), then uses the Crash Data Query Builder (3) to edit the query. Alternatively, the user may upload a previously created query statement file (5) to the Query Builder to edit instead. Once a query has been selected, or a query statement file has been uploaded and validated, the user may use the simple builder interface within the component to edit the query or update the query statements directly for more complex queries. The proposed system saves the updated query to the Crash Data Query database (3), or the user downloads the query statement file (5).

Additional Information

Further analysis is needed to determine the following:

- If crash data users should be able to edit or save a query to the Crash Data Query database or if they should be limited to uploading and downloading query statement files.
- The validation rules needed on directly entered queries or uploaded query statement files, such as prohibiting “drop” and “delete” statements.

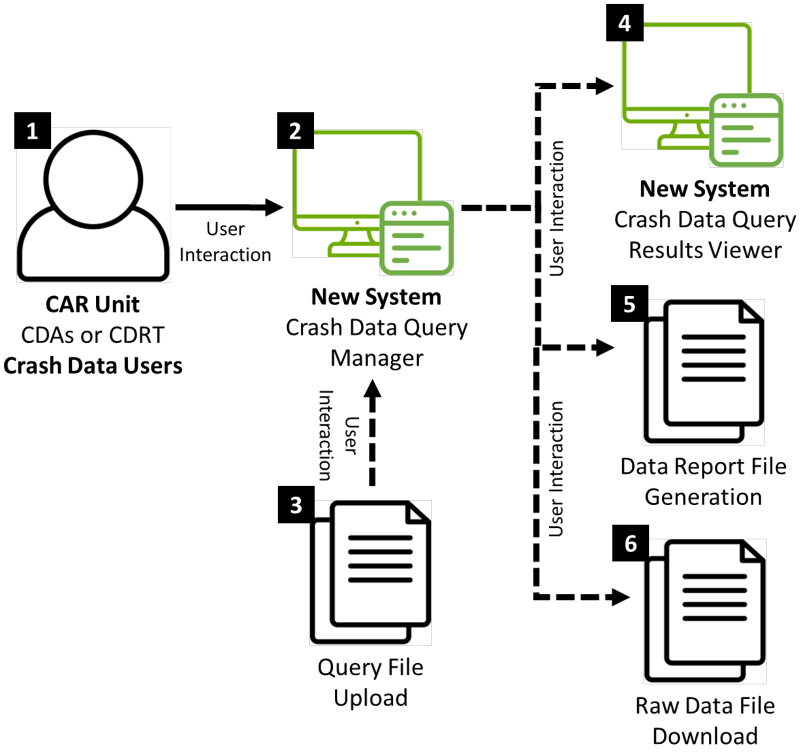
Related User Needs

See UC-C-DD-02 for user needs related to this use case.

5.4.1.4 UC-C-DD-04 – Run a Crash Data Query

In this use case, a CDA, CDRT, or crash data user runs a crash data query. The goal of this use case is to allow users to run queries and view or download the results in a variety of formats to suit the user's needs.

Use Case Diagram



Use Case Description

A CDA, CDRT (1), or a crash data user, collectively referred to as "user" in this use case description, searches for a query to run using the Crash Data Query Manager (2). Alternatively, the user may also upload a previously created query statement file to run (3). Once a query has been selected, or a query statement file has been uploaded and validated, the user may choose to view the data by using the Crash Data Query Results Viewer (4) to view the results as raw data in a table, or through an interactive map-based interface. The user may also choose to select a report template to use in conjunction with the query to generate and download a report file (5), or to download the raw data (6).

Additional Information

Further analysis is needed to determine the following:

- The validation rules needed on uploaded query statement files, such as prohibiting “drop” and “delete” statements.
- Which file formats should be supported for report and raw data file downloads.

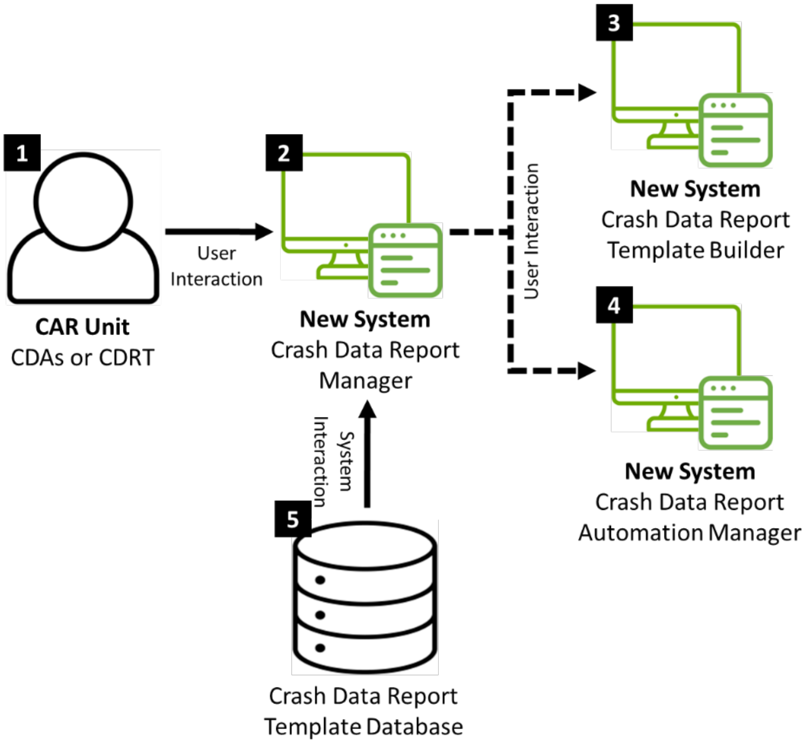
Related User Needs

- UN-C-DD-CAR-01-04

5.4.1.5 UC-C-DD-05 – Manage Crash Data Reports

In this use case, a CDA or CDRT manages data report templates and report automation. The goal of this use case is to provide a single location to manage reports and report automation through user-friendly interfaces, eliminating the need to rely on external resources and replacing the currently unsupported tool used for report template maintenance.

Use Case Diagram



Use Case Description

To view and manage data report templates and report automation, a CDA or CDRT (1), collectively referred to as "user" in this use case description, uses the Crash Data Report Manager (2). From there, the user can sort the list of reports by various data fields and search or filter the list for various criteria. Users may also:

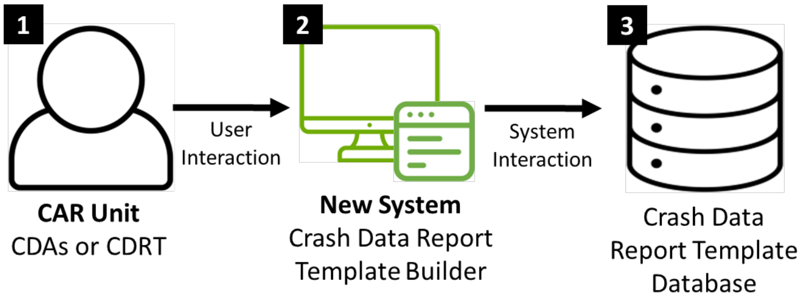
- Create or edit data report templates (see UC-C-DD-06 or UC-C-DD-07) through the Crash Data Report Template Builder (3), or
- Manage the automated generation and distribution of various crash data reports (see UC-C-DD-09) using the Crash Data Report Automation Manager (4).

Data report templates are stored in the Crash Data Report Template database (5).

5.4.1.6 UC-C-DD-06 – Create a Crash Data Report Template

In this use case, a CDA or CDRT creates a new crash data report template. The goal of this use case is to allow users to easily create new templates using a modern template builder to fulfill crash data requests and other reporting needs and eliminate the need to rely on external resources for template creation.

Use Case Diagram



Use Case Description

A CDA or CDRT (1), collectively referred to as "user" in this use case description, uses the Crash Data Report Template Builder (2) to create new crash data report templates through a simple builder interface to construct the report content and place required data fields as necessary. The proposed system saves the new template to the Crash Data Report Template database (3).

Additional Information

A project is currently underway to recreate several key data report templates and automate those using SQL Server Reporting Services (SSRS). While this project does not include all report templates, the proposed system should be able to make use of this project work by directly interfacing with, or connecting to, SSRS for the template builder.

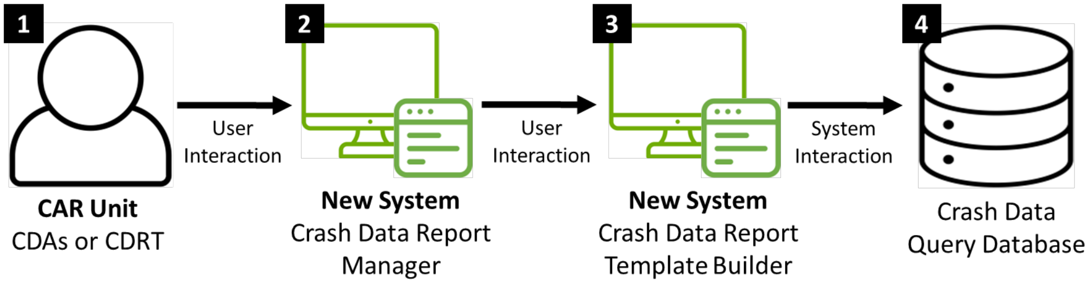
Related User Needs

- UN-C-DD-CAR-02

5.4.1.7 UC-C-DD-07 – Edit a Crash Data Report Template

In this use case, a CDA or CDRT edits a crash data report template. The goal of this use case is to allow users to easily edit templates using a modern template builder to fulfill crash data requests and other reporting needs and eliminate the need to rely on external resources for template updates.

Use Case Diagram



Use Case Description

A CDA or CDRT (1), collectively referred to as "user" in this use case description, searches for the template they wish to edit using the Crash Data Report Manager (2), then uses the Crash Data Report Template Builder (3) to edit the template through a simple builder interface to update the report content, including the required data fields, as necessary. The proposed system saves the updated template to the Crash Data Report Template database (4).

Additional Information

See UC-C-DD-06 for additional information related to this use case.

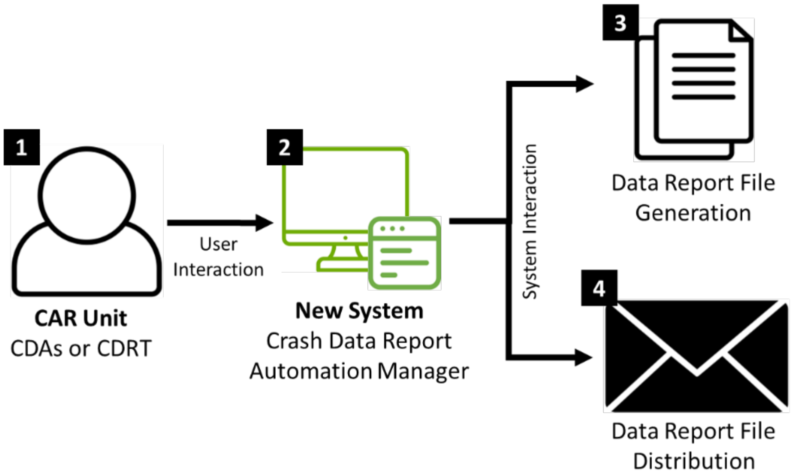
Related User Needs

See UC-C-DD-06 for user needs related to this use case.

5.4.1.8 UC-C-DD-08 – Manage Crash Data Report Automation

In this use case, a CDA or CDRT manages the automated generation and distribution of a crash data report. The goal of this use case is to allow users to manage the automation of all reports as necessary to eliminate the need to rely on external resources for automation maintenance.

Use Case Diagram



Use Case Description

A CDA or CDRT (1), collectively referred to as "user" in this use case description, opens the Crash Data Report Automation Manager (2) and sees a list of all report automations with indicators showing each automation as active or inactive. From there, the user may activate or deactivate an automation, set or change the scheduled report generation, set or change the location where a generated file is saved to, and add or update email addresses for file distribution. The proposed system uses these settings to determine when a report automation should run and save generated report files (3) to various locations or distribute files to various interested parties (4).

Additional Information

A project is currently underway to recreate several key data report templates and automate those using SQL Server Reporting Services (SSRS). While this project does not include all report templates, the proposed system should be able to make use of this project work by directly interfacing with, or connecting to, SSRS for report automation.

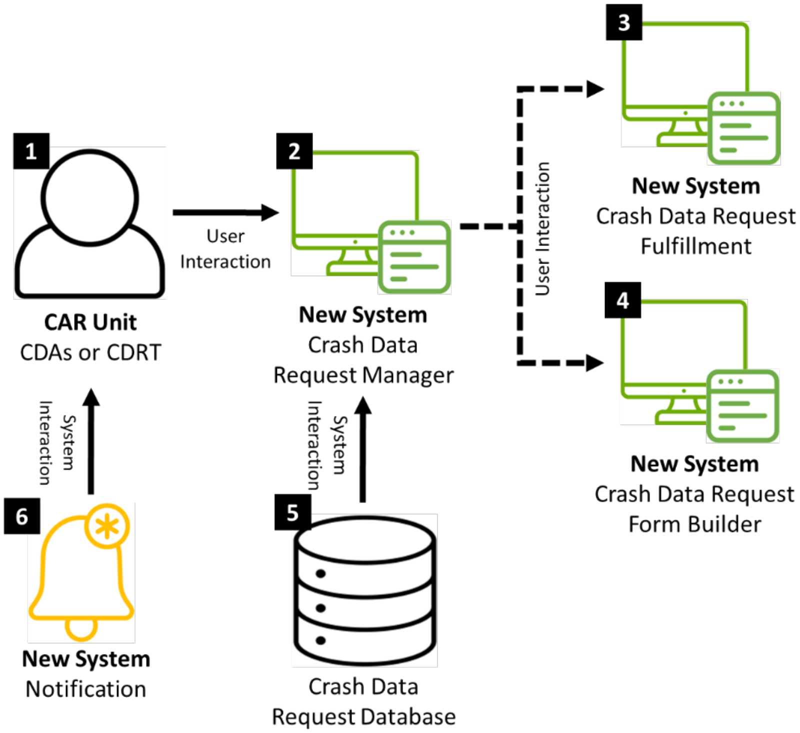
Related User Needs

- UN-C-DD-CAR-03
- UN-C-DD-CAR-04

5.4.1.9 UC-C-DD-09 – Manage Crash Data Requests

In this use case, a CDA or CDRT manages crash data requests and maintains the crash data request form. The goal of this use case is to allow users to manage requests within the proposed system, eliminating the need to track requests in an unsupported MS Access database. The crash data request form will help inform the requestor of available data fields and formats, as well as guide them to clarify what they need, mitigating the back-and-forth communication to clarify a data request that currently occurs.

Use Case Diagram



Use Case Description

A CDA or CDRT (1), collectively referred to as "user" in this use case description, opens the Crash Data Request Manager (2) to view a list of all data requests, with indicators showing if a request is new, in progress, or has been fulfilled. From there, the user can view and assign a request. The user may respond to a request directly through the Crash Data Request Fulfillment interface (3, see UC-C-DD-09-01). The user may also create and maintain the Crash Data Request Form through the Crash Data Request Form Builder (4) through a simple drag-and-drop function, allowing the user to add, move, and remove headings, text, and various form fields. The user may also receive system notification reminders (6) of outstanding requests.

Additional Information

Further analysis is needed to determine what form fields should be displayed on the Crash Data Request Form and which should be required in order to best clarify the user's needs.

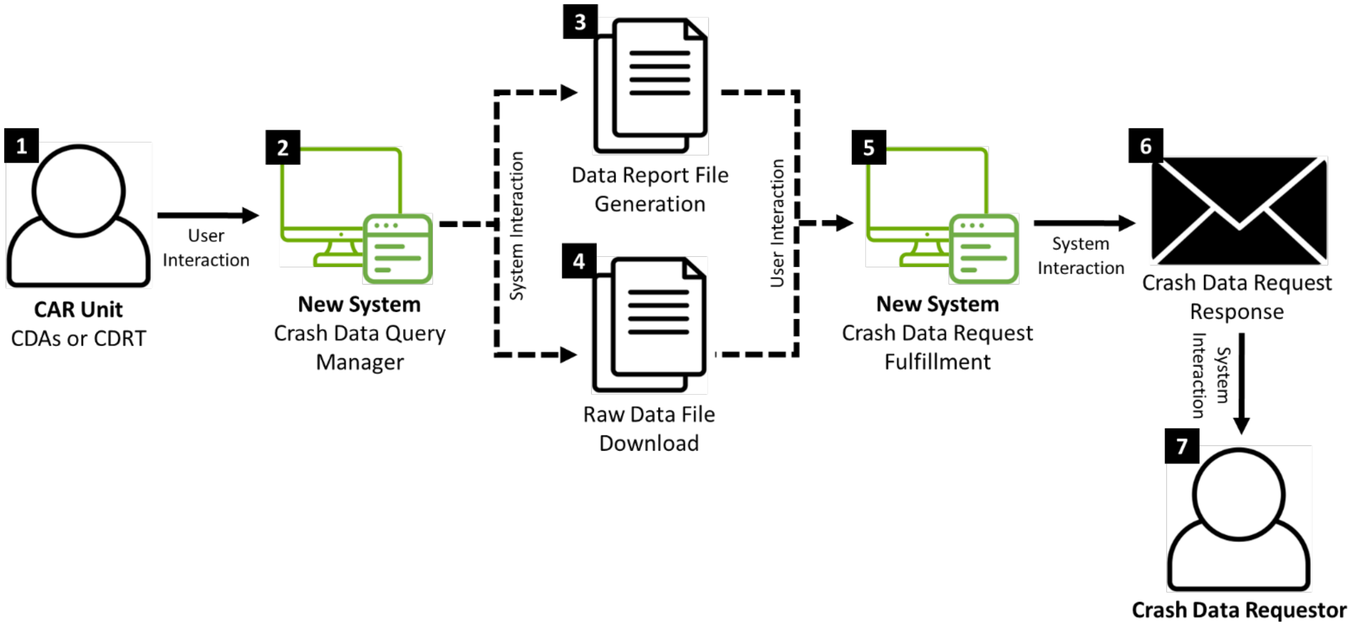
Related User Needs

- UN-C-DD-CAR-05

5.4.1.10 UC-C-DD-09-01 – Fulfill a Crash Data Request

In this use case, a CDA or CDRT fulfills a crash data request. The goal of this use case is to allow users to fulfill a data request directly through the proposed system, without having to rely on email or other external communication.

Use Case Diagram



Use Case Description

Once a crash data request has been received and assigned, the CDA or CDRT, collectively referred to as "user" in this use case description, uses the Crash Data Query Manager (2) to run or build a query to generate a report displaying the query results (3) or a raw data file (4), depending on the needs of the requestor. The user then fulfills the request by uploading the report or data file, and adding any other information needed, to the Crash Data Request Fulfillment interface (5). The proposed system then sends the response (6) to the requestor (7).

Additional Information

Further analysis is needed to determine how the proposed system will send a crash data request response to the requestor. This process may involve the response being emailed to the requestor, the requestor being notified that the response is available for them to view in the system, or some other method, as some data requests may require a secure transfer or the transfer of large files.

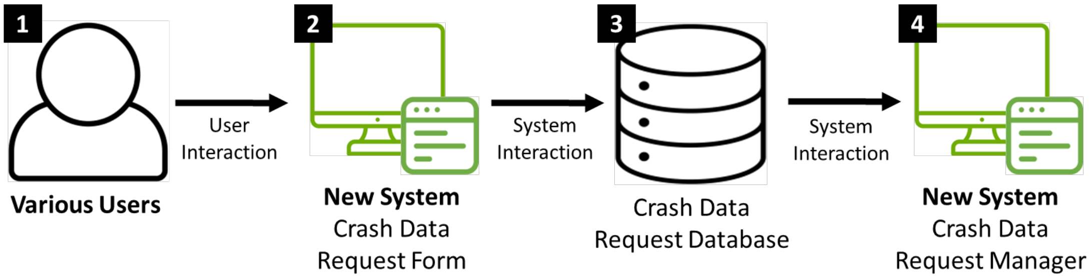
Related User Needs

See UC-C-DD-09 for user needs related to this use case.

5.4.1.11 UC-C-DD-10 – Submit a Crash Data Request

In this use case, a user internal or external ODOT submits a request for crash data. The goal of this use case is to provide a simple, straightforward form to inform the requestor of available data fields and formats, as well as guide them to clarify what they need, mitigating the back-and-forth communication to clarify a data request that currently occurs.

Use Case Diagram



Use Case Description

The user (1) opens the Crash Data Request Form (2) and fills out the form to request crash data. The user clarifies the type of data, data fields, and data format needed. Once completed, the proposed system saves the request to the Crash Data Requests database (3), and the request appears in the Crash Data Request Manager (3) for a CDA or the CDRT to address.

Additional Information

Further analysis is needed to determine what form fields should be displayed on the Crash Data Request Form and which should be required in order to best clarify the user's needs.

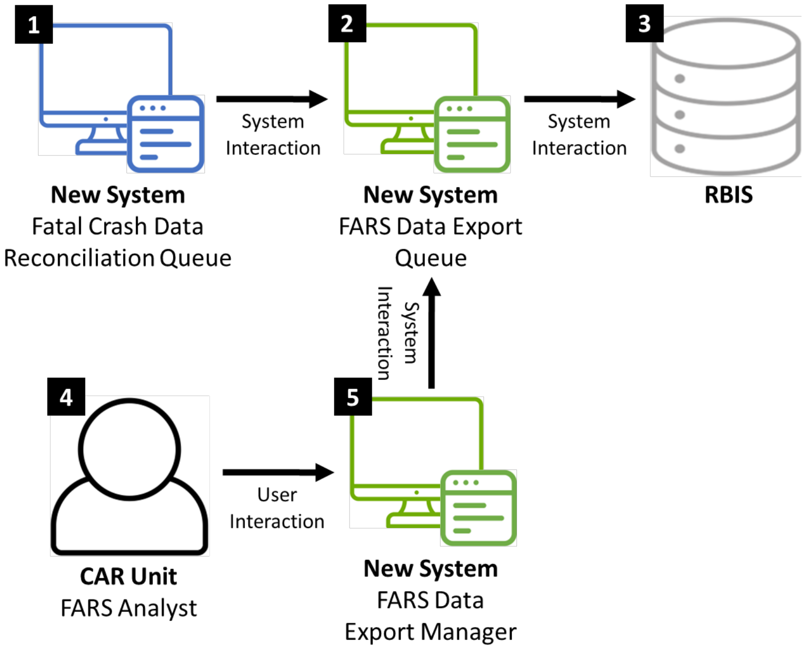
Related User Needs

- UN-C-DD-DU-01-03

5.4.1.12 UC-C-DD-11 – Manage FARS Data Export

In this use case, the FARS Analyst manages the export of data to the federal FARS Records-Based Information Solution (RBIS) system. The goal of this use case is to manage the automation of the data export and eliminate the need for additional manual data entry into RBIS.

Use Case Diagram



Use Case Description

Once a Crash Report Case File record containing FARS data has successfully passed through the Fatal Crash Data Reconciliation Queue (1) it appears in the FARS Data Export Queue (2) for export to the federal RBIS database (3). The cadence at which the data is exported is set by the FARS Analyst (4) using the FARS Data Export Manager (5).

Additional Information

Further analysis is needed to determine if and how data may be exported from the proposed system to RBIS – the process may involve a direct export to the RBIS database, the generation of a file that can be uploaded into RBIS, or some other method.

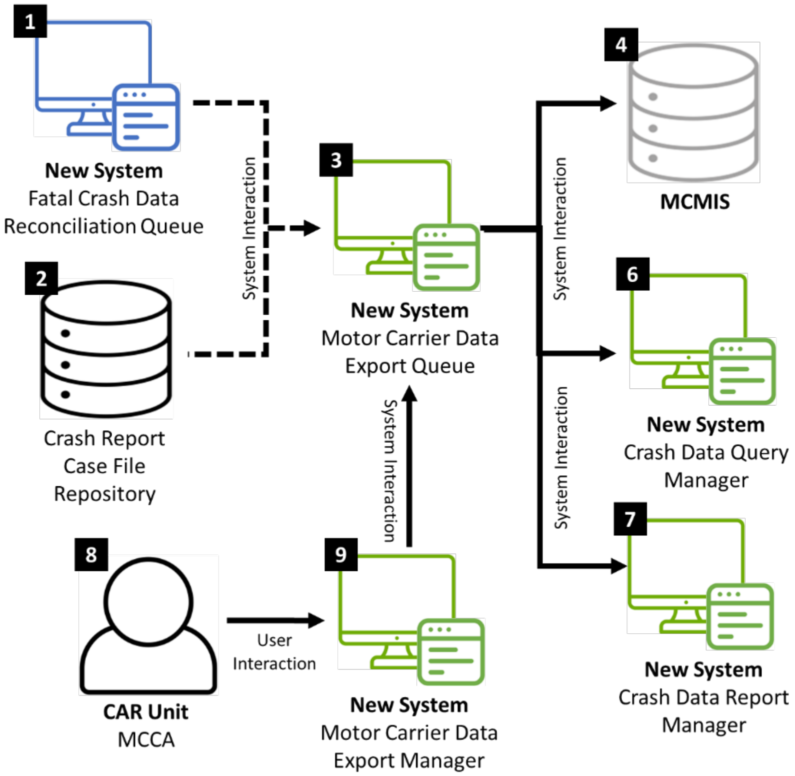
Related User Needs

- UN-C-DD-CAR-06

5.4.1.13 UC-C-DD-12 – Manage Motor Carrier Crash Data Export

In this use case, the MCCA manages the export of data to the federal Motor Carrier Management Information System (MCMIS). The goal of this use case is to manage the automation of the data export and preserve the current ability to upload data from the data coding and entry system directly into MCMIS.

Use Case Diagram



Use Case Description

Once a Crash Report Case File record containing fatal CMV data has successfully passed through the Fatal Crash Data Reconciliation Queue (1), or a Case File record from the Crash Report Case File Repository (2) containing a non-fatal CMV crash is completed, it appears in the Motor Carrier Data Export Queue (3) for export to the federal MCMIS database (4). In addition, the data is made available for querying and reporting in the Crash Data Query Manager (6) and the Crash Data Report Manager (7). The cadence at which the data is exported is set by the MCCA (8) using the Motor Carrier Data Export Manager (9).

Additional Information

Further analysis is needed to determine if and how data may be exported from the proposed system to MCMIS – the process may involve a direct export to the MCMIS database, the generation of a file that can be uploaded into MCMIS, or some other method.

Related User Needs

- UN-C-DD-CAR-06

5.5 Other Use Cases

This section contains the use cases for the proposed system unrelated to a specific functional area. All use cases apply to the proposed system regardless of operational scenario.

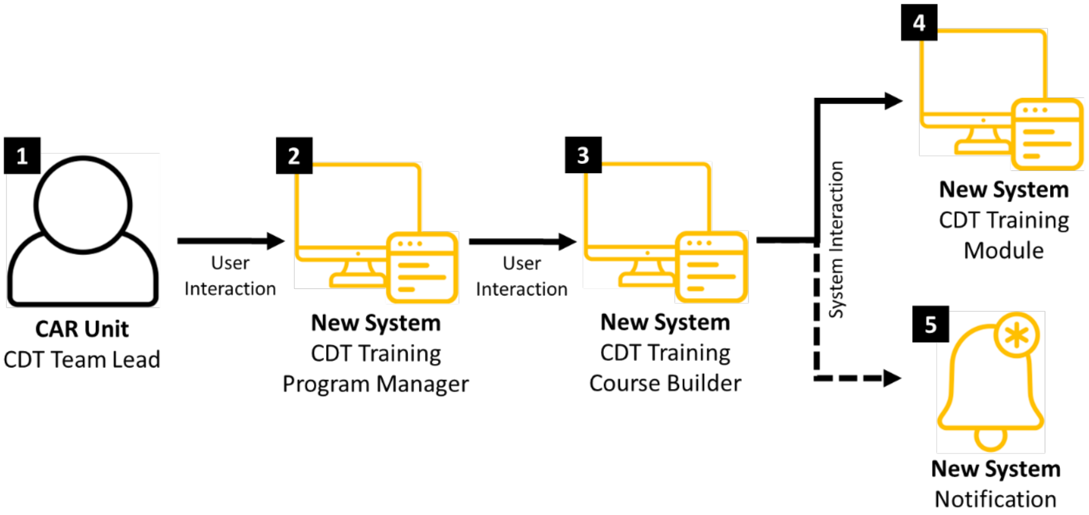
Note that for all of the following use cases, security trimming should be enforced within the proposed system so certain components or interfaces are only available to certain users. Further analysis will be needed to determine permission levels.

5.5.1 Common Use Cases

5.5.1.1 UC-C-O-01 – Maintain CDT Training Program

In this use case, the CDT Team Lead maintains the training program used by the CDTs. The goal of this use case is to allow the user to add, update, or delete training courses within the program in order to mitigate the current difficulties in the training process and get CDTs up to speed with the latest coding requirements in a timelier manner.

Use Case Diagram



Use Case Description

To make changes to the courses within the overall CDT training program, the CDT Team Lead (1) opens the CDT Training Program Manager (2) to access the CDT Training Course Builder (3). From there, the CDT Team Lead can create a new training course, or modify or delete an existing training course. The changes then appear in the CDT Training Module (4). If a new course is added or an existing course updated, the CDT Team Lead assigns the course to one or more CDTs and the proposed system sends out a notification (5) to the applicable CDTs.

Additional Information

Further analysis is needed to determine what courses should be included in the CDT training program, what content should be included in those courses, and which courses should be optional or required.

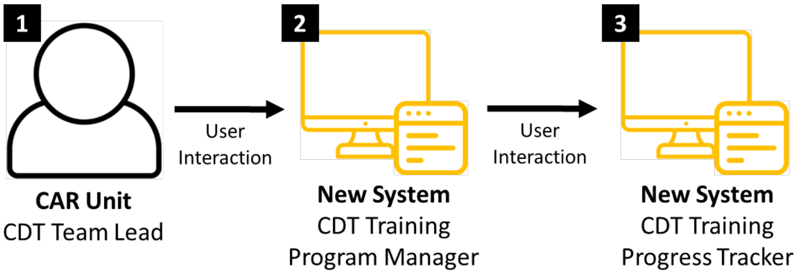
Related User Needs

- UN-C-O-CAR-01

5.5.1.2 UC-C-O-01-01 – Track CDT Training Progress

In this use case, the CDT Team Lead reviews the training progress of all CDTs. The goal of this use case is to allow the user to easily stay up to date on the training progress of various CDTs, particularly new CDTs.

Use Case Diagram



Use Case Description

The CDT Team Lead (1) opens the CDT Training Program Manager (2) to access the CDT Training Progress Tracker (3). From there, the CDT Team Lead sees a list of all CDT training programs and indicators showing the progress of each.

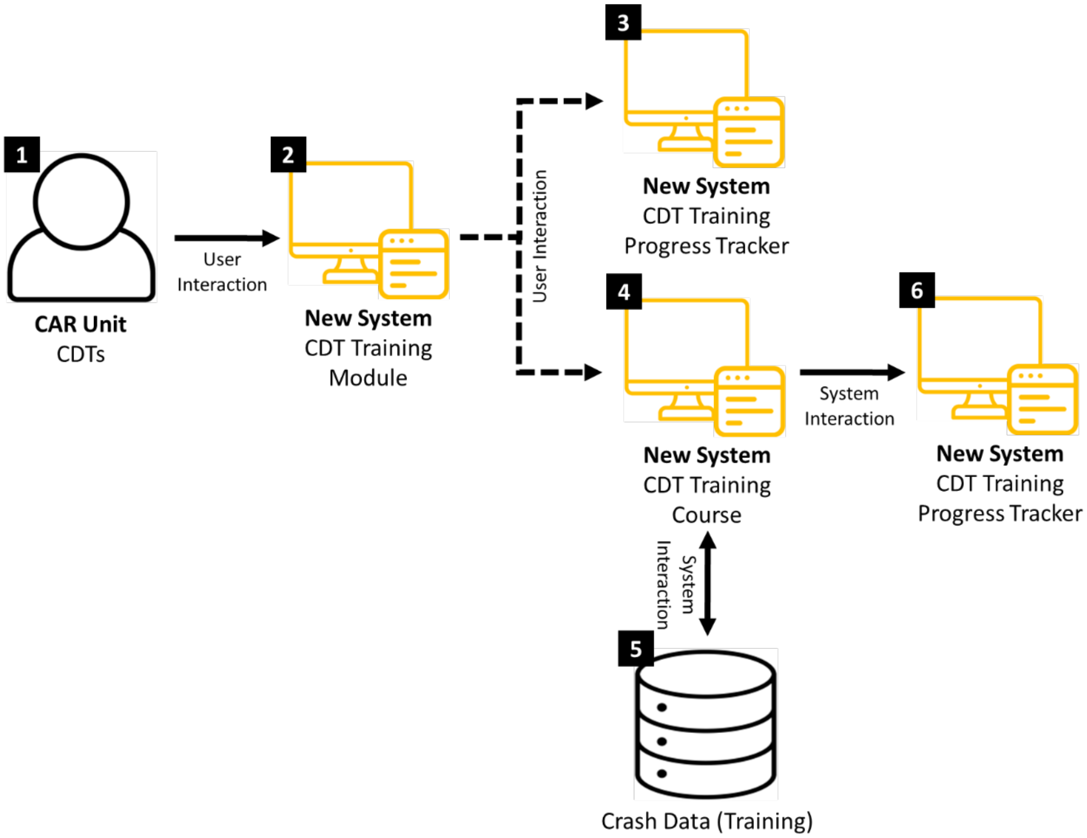
Related User Needs

- UN-C-O-CAR-01

5.5.1.3 UC-C-O-01-02 – Take CDT Training

In this use case, a CDT takes various training courses or tracks their training progress. The goal of this use case is to allow users to engage in training at their own pace, in order to mitigate the current difficulties in the training process and get CDTs up to speed with the latest coding requirements in a timelier manner.

Use Case Diagram



Use Case Description

The CDT (1) opens the CDT Training Module (2). From there, the CDT can view their progress through the CDT Training Progress Tracker (3) or start or continue with a CDT Training Course (4). While the CDT participates in a training course, the proposed system pulls data from and saves data to the Crash Data Training database (5).

Once a training course has been started, the CDT can complete it or choose to save their progress and resume later. The proposed system captures their progress, which is displayed in the CDT Training Progress Tracker (6).

Additional Information

A Crash Data Records Training database must be utilized throughout the CDT Training Module in order to protect the integrity of the production database.

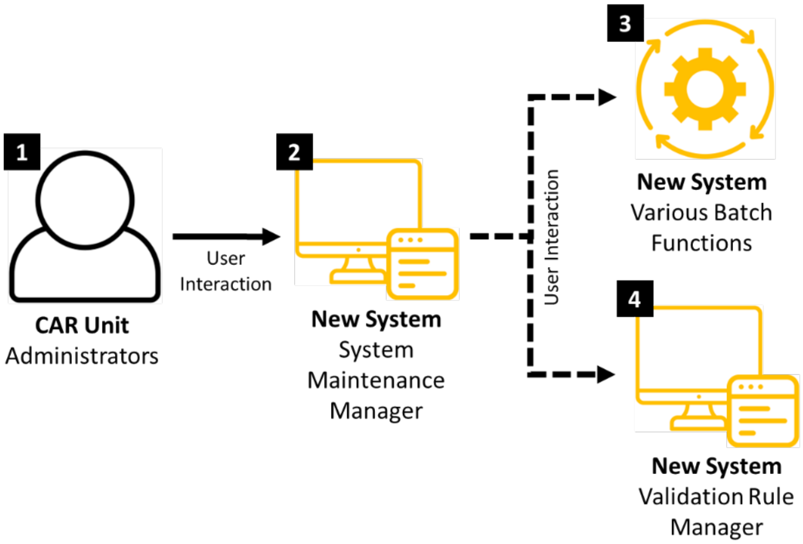
Related User Needs

- UN-C-O-CAR-01

5.5.1.4 UC-C-O-02 – Perform System Maintenance

In this use case, a user with administrator permissions performs various system maintenance tasks. The goal of this use case is to allow certain system maintenance tasks to be performed without the need to rely on external resources.

Use Case Diagram



Use Case Description

To perform various system maintenance tasks, a user with administrator permissions (1) opens the System Maintenance Manager (2). From there, the administrator may run various batch functions (3). The administrator may also use the Validation Rule Manager (4) to add, change, or delete a variety of validation rules used in both initial validation when a Crash Data record or Crash Report Case File record is saved, the rules used in the final validation for Crash Data records prior to data distribution, or the rules used in fatal crash data reconciliation.

Additional Information

Descriptions of various batch functions used currently in the CDS can be found in 2.2.1.4.1 Batch Functions. Further analysis is needed to determine which batch functions will need to be recreated within the proposed system, as well as what other functions are needed.

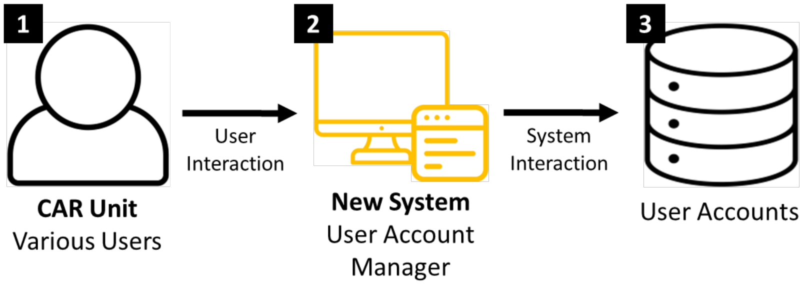
Related User Needs

- UN-C-DP-CAR-05-02
- UN-C-O-CAR-02

5.5.1.5 UC-C-O-03 – Manage User Accounts

In this use case, various CAR Unit staff manage their user account in the proposed system. The goal of this use case is to allow for users to set certain preferences. In addition, this use case applies to users with administrator permissions to allow them to create, edit, or delete user accounts to manage permissions in order to mitigate the need to rely on external resources.

Use Case Diagram



Use Case Description

All users with accounts in the new system replacing the CDS (1) can use the User Account Manager (2) to set the default display preferences for the Crash Report Case File Validation Queue, such as to sort records by injury severity or only see records indicating a fatality. Users can also set their preferences for system notifications, such as to be notified when a new Case File record is added that indicates the involvement of a CMV. The system then saves these preferences to a User Accounts database (3).

Alternatively, users with administrator permissions (1) can use the User Account Manager (2) to add or delete user accounts, as well as change the permission levels of a user account. The system saves these changes to the User Accounts database (3).

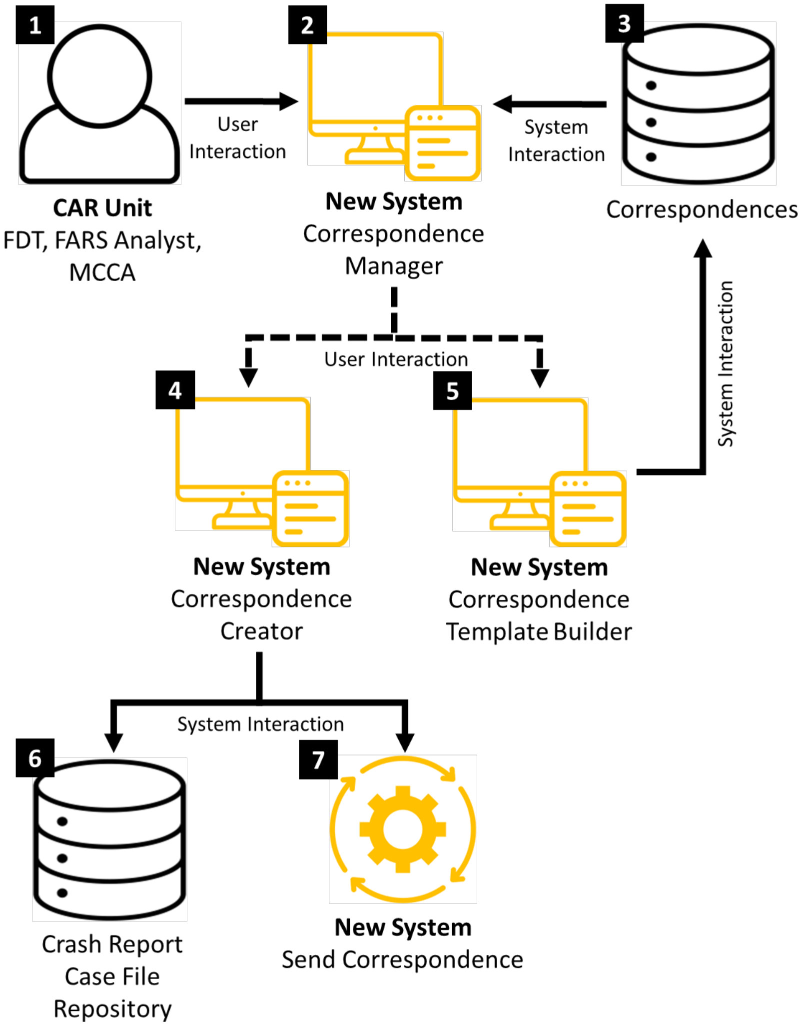
Related User Needs

- UN-C-DP-CAR-03
- UN-C-O-CAR-02
- UN-C-O-CAR-02-01

5.5.1.6 UC-C-O-04 – Manage Correspondence

In this use case, the FDT, FARS Analyst, or MCCA manages correspondence to various external parties to request data records and send compliance letters. The goal of this use case is to track correspondences to determine how many contact attempts have been made and which records requests have been fulfilled.

Use Case Diagram



Use Case Description

The FDT, FARS Analyst, or MCCA (1), collectively referred to as “user” in this use case description, opens the Correspondence Manager (2) to see a list of all active and completed correspondences, populated from a Correspondences database (3). For each correspondence, the proposed system displays the number of attempts to reach the external party as well as the most recent date and time an attempt was made. From there, the user can use the Correspondence Creator (4) to create a new correspondence by selecting a template and querying the Crash Report Case File Repository (6) for records of interest, such as all records that indicate a fatality but are missing a crash report from law enforcement and indicating which parties the correspondence should be sent to. The proposed system then sends the correspondence to the parties indicated (7). The user can also resend any previously sent correspondence if no response has been received.

The user can also use the Correspondence Template Builder (5) to create new or modify existing correspondence templates through a simple interface. The system saves all correspondence templates to the Correspondences database (3).

Additional Information

The Correspondence Template Builder is expected to utilize a similar interface to the Crash Data Report Builder.

While certain correspondence types have been identified such as EMS records requests, law enforcement crash report requests, and Motor Carrier compliance letters, further analysis is needed to determine what other correspondence types should be included.

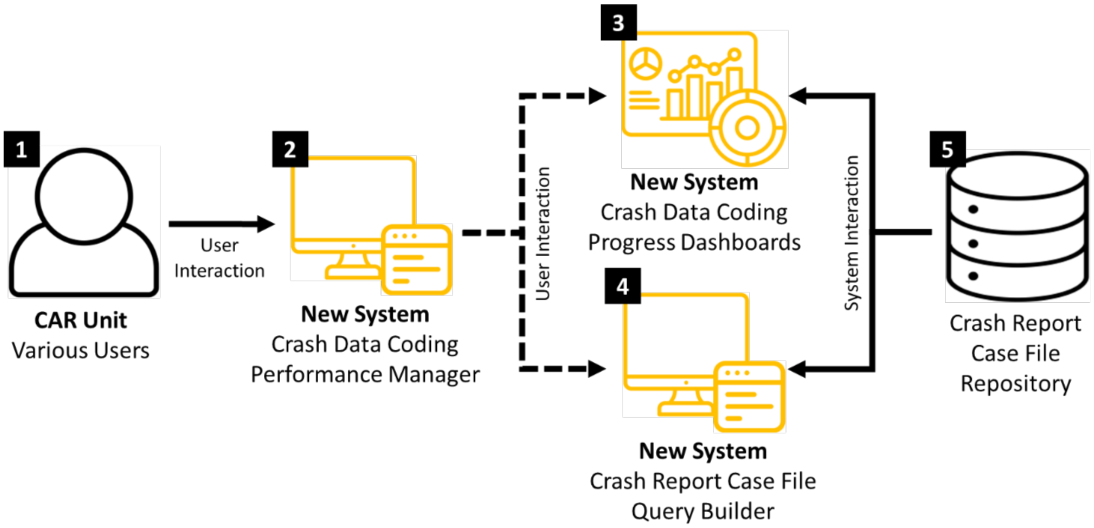
Related User Needs

- UN-C-O-CAR-03

5.5.1.7 UC-C-O-05 – Review Coding Performance

In this use case, various CAR Unit staff and the CAR Unit manager view performance dashboards and query the Crash Report Case File records. The goal of this use case is to allow users to monitor the crash data coding progress, and to query for records of particular interest, such as those received in a certain year within a certain county that have not yet been coded.

Use Case Diagram



Use Case Description

To review coding performance, the user (1) opens the Crash Data Coding Performance Manager (2). From there, the user can view various Crash Data Coding Progress Dashboards (3) or use the Crash Report Case File Query Builder (4) to query Case File records of interest. Both the Dashboards and the Query Builder read data from the Crash Report Case File Repository (5).

Additional Information

Several dashboards have been created to monitor coding progress using Power BI. It is expected that the dashboards within the new system maintain the same level of detail, if not more.

Related User Needs

- UN-C-O-CAR-04
- UN-C-O-CAR-04-01

5.6 Processes Not Included

The following processes were not included as use cases in this section, as they either do not involve any interaction with the overall system, or do not involve any interaction with the new components within the proposed system. Though workflows may change in the future, the current general workflow descriptions for each of the following processes can be found in 2 Current System and Environment.

- Citizen/law enforcement submits paper crash report.
- Determine paper crash report acceptability.

- Paper crash report imaging.
- Determine if a Crash Report Case File should be split.

6 Summary of Impacts

6.1 Operational Impacts

The proposed system will have a direct impact on the operational nature of law enforcement agencies, the Driver and Motor Vehicle Services (DMV) Crash Reporting Unit (CRU), the Crash Analysis and Reporting (CAR) Unit, and crash data end users.

6.1.1 Law Enforcement Agencies

The operational impacts for law enforcement agencies include:

- **A new option to submit crash reports.** The implementation of an electronic crash report submission method will eliminate the need for law enforcement officers to submit a paper crash report and is expected to improve the accuracy of submitted data and the timeliness of report submission.
- **Changes to existing systems or introduction of a new system.** While the exact nature of the electronic crash report submission method is not yet determined, it may involve the introduction of a new standardized system for law enforcement agencies to use to submit their crash reports. If so, law enforcement agencies may need to adopt the new system or adapt their existing systems to be able to provide data to the new system.

6.1.2 DMV CRU Operational Impacts

The operational impacts for the DMV CRU Crash Report Processors include:

- **Changes to the crash report submittal process.** The implementation of electronic submission methods for citizens/drivers and law enforcement agencies will, over time, reduce the number of reports requiring transfer from the DMV Mailroom, manual sorting, and crash report imaging.
- **Changes to the paper crash report sorting process.** The implementation of various process improvements to sort and prioritize crash reports containing fatalities or Commercial Motor Vehicles (CMVs) as well as higher severity crashes will improve the timeliness of transfer of these key crash reports to the CAR Unit for further processing. Some changes may also, however, result in additional responsibilities for the DMV CRU staff.
- **Changes to the crash report acceptance process.** The implementation of an automated method of determining if an electronically submitted crash report is reportable or non-reportable will, over time, reduce the number of reports requiring manual review.
- **Changes to the crash report matching process.** The implementation of a centralized repository for Crash Report Case Files and an automated method of matching electronically submitted crash reports will, over time, reduce the number of reports requiring manual matching and improve the timeliness of the transfer of report data to the CAR Unit. In addition, the process to manually match any paper crash reports will be simplified by the ability to easily search for matching reports in the Crash Report Case File Repository. If further analysis finds that Optical Character Recognition (OCR) or some similar technology is a viable option for paper reports, the amount of paper reports requiring manual matching will be reduced even further.

6.1.3 CAR Unit Operational Impacts

The operational impacts for the CAR Unit are organized below by program area.

6.1.3.1 Crash Data Coding Program Area

The operational impacts for the crash data coding program area include:

- **Changes to DMV CRU processes.** The changes described above impacting the DMV CRU will also impact the CAR Unit Crash Data Technicians (CDTs) by improving the timeliness of the transfer of report data to the CAR Unit, allowing CDTs to review the report data, analyze, and code crash data sooner. In addition, the implementation of electronic crash report submission methods will mitigate the difficulties currently faced in comprehending hand-written paper reports.

- **Changes to the data entry process.** The implementation of a basic crash and location data import function for electronically submitted crash reports when creating new Crash Data records will reduce the number of data fields requiring manual data entry. This impact applies to Operational Scenario A only.
- **Changes to the "code to paper" process.** The implementation of a Crash Data Import interface within the new system allows CDTs to create Crash Data records from a variety of file formats. If a system outage occurs, this will eliminate the need for additional manual data entry when the system is restored. It also allows for the coding of certain crash types to be outsourced.
- **Changes to the initial validation process.** The implementation of improved initial validation rules within the new system will reduce the number of warnings and errors returned that the CDT must either address prior to saving (for errors) or that the CDT Team Lead must address during the final approval process (for warnings disregarded by CDTs).
- **Changes to the final validation and approval process.** The implementation of the automated regular validation of crash data eliminates the need for time-consuming annual quality assurance/quality control (QA/QC) procedures occurring at the end of a crash coding year and improves the timeliness of the release of crash data for distribution and reporting. In addition, the automation of this process eliminates the current daily, time-consuming task of manually running the batch approval process.

6.1.3.2 Fatal Crash Program Area

The operational impacts for the fatal crash program area include:

- **A single source of data for a crash event.** The implementation of a centralized repository for Crash Report Case Files where all data relevant to a crash event can be accessed will eliminate the current need for multiple case files across disparate systems for the same event.
- **Changes to fatal data management.** The implementation of a data entry interface in the new system to capture additional data fields necessary for fatal data tracking and reporting will replace the currently used Fatality Tracker and Oregon Fatality Analysis Reporting System (FARS) Tracking Access databases and improve the security and integrity of the data.
- **Introduction of a "code to paper" process.** The implementation of a Crash Report Case File Import interface within the new system allows the Fatal Data Technician (FDT) and FARS Analyst to create Crash Report Case File records to include additional data for fatal crash data tracking and reporting from a variety of file formats. If a system outage occurs, this will eliminate the need for additional manual data entry when the system is restored.
- **Introduction of correspondence tracking.** The implementation of a correspondence management interface within the new system which allows the user to easily determine how many times a correspondence attempt has been made for a particular purpose (e.g., requesting a crash report from a law enforcement agency) will mitigate the difficulties currently experienced in manually keeping track of correspondence attempts across various systems.
- **Introduction of correspondence templates.** The implementation of correspondence templates used for particular purposes (e.g., requesting Emergency Medical Services (EMS) records) will provide needed consistency in the correspondences sent.
- **Changes to the fatal data reconciliation process.** The implementation of an automated regular reconciliation process to compare fatal crash data in both Crash Data records, Fatal Crash Reporting records, and CMV Crash Reporting records (for fatal CMV crashes) will improve the quality of fatal crash

data prior to release for distribution and reporting. In addition, the change from monthly to a more regular reconciliation cadence will improve the timeliness of the release of the data.

- **Changes to the data distribution process.** The implementation of greater interoperability with the federal FARS Records-Based Information Solution (RBIS) system will eliminate the need for additional manual data entry, as well as improve the timeliness of FARS data reporting. This is key to meeting federal reporting requirements.

6.1.3.3 CMV Crash Program Area

The operational impacts for the CMV crash program area include:

- **A single source of data for a crash event.** The implementation of a centralized repository for Crash Report Case Files where all data relevant to a crash event can be accessed will eliminate the current need for multiple case files across disparate systems for the same event.
- **Changes to CMV crash data management.** The implementation of a data entry interface in the new system to capture additional data fields necessary for CMV crash reporting will replace the currently used SAFETYNET Access database and improve the security and integrity of the data.
- **Introduction of a "code to paper" process.** The implementation of a Crash Report Case File Import interface within the new system allows the Motor Carrier Crash Analyst (MCCA) to create Crash Report Case File records to include additional data for CMV crash data tracking and reporting from a variety of file formats. If a system outage occurs, this will eliminate the need for additional manual data entry when the system is restored.
- **Introduction of correspondence tracking.** The implementation of a correspondence management interface within the new system which allows the user to easily determine how many times a correspondence attempt has been made for a particular purpose (e.g., sending Motor Carrier Compliance letters) will mitigate the difficulties currently experienced in manually keeping track of correspondence attempts across various systems.
- **Introduction of correspondence templates.** The implementation of correspondence templates used for particular purposes (e.g., sending Motor Carrier Compliance letters) will provide needed consistency in the correspondences sent.
- **Changes to the data distribution process.** The implementation of greater interoperability with the federal Motor Carrier Management Information System (MCMIS) will eliminate the need for additional manual data entry, as well as improve the timeliness of CMV crash data reporting. This is key to meeting federal reporting requirements.

6.1.3.4 Crash Data Reporting Program Area

The operational impacts for the Crash Data Reporting program area include:

- **Changes in crash data query management.** The implementation of the Crash Data Query Manager and all related interfaces will greatly improve the user experience in creating and managing crash data queries through an improved query builder interface, the inclusion of a method to directly enter query statements, and a searchable query library. This will improve the timeliness of crash data request fulfillment.
- **Changes in crash data report management.** The implementation of the Crash Data Report Manager and all related interfaces will greatly improve the user experience in creating and managing report templates, as well as managing the automation of various reports. In addition, this will eliminate the need to rely on external resources to make changes to the current unsupported CDS Crystal Reports, improve the timeliness of crash data request fulfillment, and improve the cadence and consistency of report distribution by mitigating the need for regular manual report generation.

- **Introduction of a crash data request form.** The implementation of a crash data request form that provides information on the data fields and formats available and helps guide the requestor to provide more clarity in their request will mitigate the current need for back-and-forth communication to determine what the requestor needs and improve the timeliness of crash data request fulfillment.

6.1.3.5 Administrative Program Area

The operational impacts for the administrative program area include:

- **Changes to the CDT training process.** The implementation of a training program within the new system that can be directly modified by the CDT Team Lead will allow new CDTs to receive all of the training they need in a timelier manner. It also allows the CDT Team Lead to introduce new training courses at any time (e.g., when the coding rules for a particular data field change) which the CDT Team Lead can assign to all CDTs. This will, over time, improve the consistency with which crash data is coded. In addition, the inclusion of this training program within the new system eliminates the current need to maintain an entire secondary system for training purposes.
- **Changes to the permissions management process.** The implementation of a user account management interface within the new system allows users with administrative permissions to create, modify, and delete user accounts and assign permissions as appropriate. This reduces the need to rely on external resources.
- **Changes to CDT performance monitoring.** The implementation of a performance management interface within the new system which allows a user to query the Crash Report Case File Repository directly will allow the user to easily determine the coding performance in any given category (e.g., the number of Crash Data records coded for fatal crashes involving bicyclists that occurred within a given time period).

6.1.4 Crash Data End Users

The operational impacts for crash data end users include:

- **Addition of a one-stop-shop crash data tool.** The implementation of a crash data query management interface, which may look or function differently for crash data end users than for CAR Unit staff, will provide a one-stop-shop crash data tool to meet a wide variety of end user needs. The tool will allow users to build custom queries through a user-friendly query building interface and see their results in a variety of formats, including visually on an interactive map. It is expected that this tool will replace a variety of existing crash data tools, most notably the TransViewer application which users find particularly difficult to work with.
- **Introduction of a crash data request form.** The implementation of a crash data request form that provides information on the data fields and formats available and helps guide the requestor to provide more clarity in their request will mitigate the current need for back-and-forth communication to determine what the requestor needs and improve the timeliness of crash data request fulfillment.

6.2 Organizational Impacts

The proposed system will have a direct impact on the organizational nature of the DMV CRU and the CAR Unit in the following ways:

- **Potential for resource reallocation.** With an expected reduction in the number of paper reports received requiring manual review and processing, as well as the implementation of various automated processes, some reallocation of staff resources and a potential decrease in the cost of some operations is expected over time. However, as staff will need to be fully trained on the new system there may be a temporary increase in the cost of some operations.

- **New process and system training.** The implementation of a new system and new components to existing systems, as well as new or revised crash data processes, will necessitate the development of various trainings and require all relevant staff to receive the applicable training.
- **Additional system maintenance responsibilities.** The implementation of various new maintenance capabilities within the new system, such as validation rule maintenance and CDT training program maintenance, will require the relevant staff to take greater responsibility in system maintenance and mitigate the need to rely on external resources. This likely only impacts certain staff within the CAR Unit, as maintenance responsibilities for new components to existing DMV systems are likely to remain unchanged.

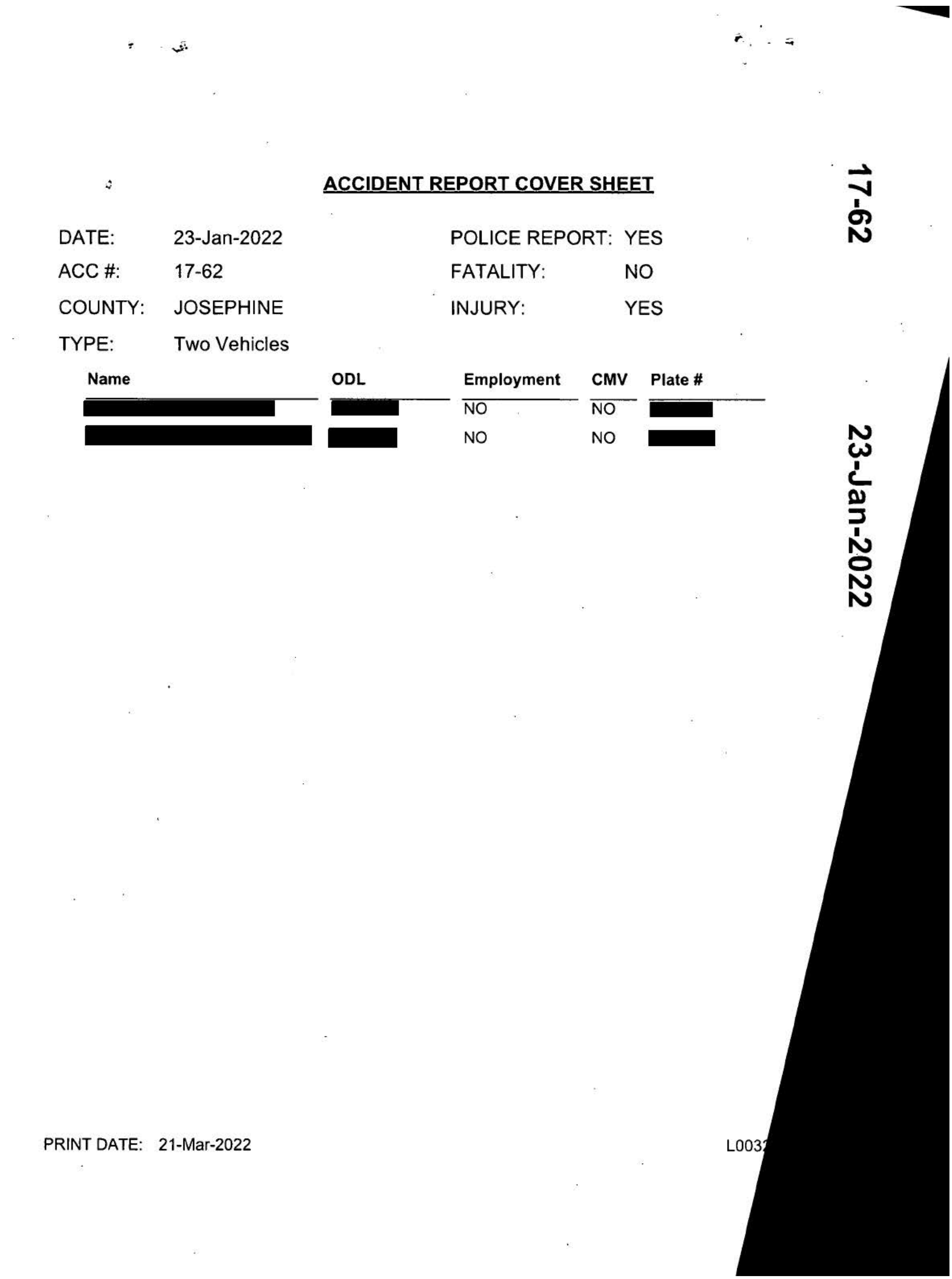
6.3 Impacts During Development and Implementation

The development phase for the proposed system involves system design, testing, and verification. The impacts anticipated to occur during development of the proposed system affecting the DMV CRU and the CAR Unit, and likely other user groups such as law enforcement agencies and crash data end users, include:

- **Involvement in meetings and partner engagement.** Various staff and partners will need to be involved in regular meetings with the proposed system development team throughout the development process. Critical milestones where significant staff participation is expected includes system requirements development and workshops for further analysis required for the development of the proposed system.
- **Involvement in system testing throughout development.** The testing of various system components (both those within the new system and those added to existing DMV systems) throughout development may require close coordination between user groups and will require time and effort of key staff and partners.
- **Parallel operation of the proposed and existing systems.** Since the new system is directly replacing an existing system, and the overall proposed system involves various process changes, significant parallel operations are expected. This likely only impacts certain staff within the CAR Unit, as the new system will replace the CDS, and DMV CRU as new components to existing systems must operate in parallel with existing processes.
- **Pilot demonstration and acceptance testing will be required.** Before the proposed system goes live, key users will participate in acceptance testing, which may involve effort to support the precondition, testing, and post-condition observations necessary to verify whether the pilot system meets the proposed system requirements.
- **Participation in system training.** Since the proposed system entirely replaces an existing system and significantly modifies the workflows others, all users of the overall proposed system will be required to participant in training on system components, interfaces, and functions relevant to their area of work.

Appendix A – Redacted Driver and Police Crash Reports

See next page.



ACCIDENT REPORT COVER SHEET

DATE: 23-Jan-2022

ACC #: 17-62

COUNTY: JOSEPHINE

TYPE: Two Vehicles

POLICE REPORT: YES

FATALITY: NO

INJURY: YES

Name	ODL	Employment	CMV	Plate #
[redacted]	[redacted]	NO	NO	[redacted]
[redacted]	[redacted]	NO	NO	[redacted]

PRINT DATE: 21-Mar-2022

L003

17-62

23-Jan-2022

DMV

OREGON TRAFFIC ACCIDENT AND INSURANCE REPORT

COMPLETE BOTH SIDES

Complete this form ONLY if your accident happened on a highway or premises open to the public, and resulted in **any** of the following: 1) More than $2500 in damage to your vehicle; 2) More than $2500 in damage to any one person's property other than a vehicle; 3) Any vehicle has more than $2500 and any vehicle is towed from the scene as a result of damages; 4) Injury to any person (no matter how minor the injury); or, 5) the death of any person.

SECTION 1

ACCIDENT DATE: 1/23/2022
DAY OF WEEK: M T W TH F S [✓ SN]
TIME OF DAY: 6:20 AM [✓ PM]
COUNTY: Josephine

DO NOT WRITE IN THIS SPACE Accident Number ______

ROAD ON WHICH ACCIDENT OCCURRED (Name of street, road or route): Redwood Hwy / NE F St.
MILE POST:

☒ WITHIN 20 FEET [✓ N] S [✓ E] W — NAME OF NEAREST INTERSECTING ROAD: F. St.
☐ NEAR ___ MILES N S E W

☒ WITHIN ✓ FEET N S E W — NAME OF NEAREST CITY / TOWN: Grants Pass
☐ NEAR ___ MILES N S E W

TYPE OF ACCIDENT - The accident involved one or more of the following: **(Mark all that apply)**

☐ Two vehicles	☐ ATV / Snowmobile	☐ Parked vehicle
☐ More than two vehicles	☐ Motorcycle	☐ Overturned vehicle
☐ Fatality	☐ Motorized Scooter	☐ Animal
☐ Bicycle	☐ Personal (assisted) mobility device	☐ Fixed object / property
☐ Pedestrian	☐ Train	☐ Other ______

SECTION 2 (YOUR VEHICLE #1)

Complete ALL of this section. If you fail to do so, your driving privileges may be suspended. You **MUST** list the insurance company (not agent) and policy number that provided liability coverage for the vehicle you were driving.

DRIVER'S NAME (LAST, FIRST, MIDDLE): [redacted]
DRIVER'S LICENSE NUMBER: [redacted]
STATE: OR
DATE OF BIRTH: [redacted] 1986
SEX (CIRCLE): M [✓ F] X

DRIVER'S RESIDENCE ADDRESS: [redacted]
CITY: Grants Pass STATE: OR ZIP CODE: 97526
☒ CHECK BOX IF ADDRESS CHANGE

MAILING ADDRESS (IF DIFFERENT THAN RESIDENCE): [redacted]
CITY: Grants Pass STATE: OR ZIP CODE: 97527

VEHICLE OWNER'S NAME AND ADDRESS: ☒ SAME
CITY: STATE: ZIP CODE:

INSURANCE COMPANY NAME (NOT AGENT) AND ADDRESS: State Farm Insurance
CITY: Grants Pass STATE: OR ZIP CODE: 97526

POLICY NUMBER: [redacted]
VEHICLE IDENTIFICATION NUMBER: [redacted]
VEHICLE PLATE NUMBER: [redacted]
STATE: OR YEAR: 13 MAKE & MODEL: CHEV SLV

MC

SECTION 3

Check all statements that apply:

- ☒ **Damage to your vehicle was more than $2500.**
- ☐ **Damage to any one person's property (other than vehicle) was more than $2500.**
- ☒ **Your vehicle was towed from the scene as a result of damages.**
- ☐ **You or passengers in your vehicle were injured.**
- ☐ The accident occurred while you were driving your employer's vehicle.
- ☐ You were driving on your job and being paid for the principal purpose of driving.
- ☐ You were being paid to drive and/or deliver persons or property.
- ☐ You were operating a government owned vehicle marked for transporting mail in accordance with government rules.
- ☐ You were operating an authorized emergency vehicle.
- ☐ You were operating a commercial motor vehicle requiring you to have a commercial driver license.
  - ☐ You were transporting hazardous material.
- ☐ The accident occurred in a work or maintenance zone. ORS 811.230
- ☒ A police officer came to the scene.
  Name of police department: Grants Pass DPS ☒ City ☐ County ☐ State Police
- ☐ A citation was issued to you. The citation was: ______

0204 2022 063

0204 2022 063

SECTION 4 (OTHER VEHICLE #2)

DRIVER'S NAME (LAST, FIRST, MIDDLE): [redacted]
DRIVER'S LICENSE NUMBER: [redacted]
STATE: OR
DATE OF BIRTH: [redacted] 1987
SEX (CIRCLE): M [✓ F] X

DRIVER'S ADDRESS: [redacted]
CITY: ~~Grants Pass~~ Williams STATE: OR ZIP CODE: 97544

VEHICLE OWNER'S NAME AND ADDRESS: ☒ SAME
CITY: STATE: ZIP CODE:

INSURANCE COMPANY NAME (NOT AGENT) AND ADDRESS: State Farm Insurance

POLICY NUMBER: [redacted]
VEHICLE IDENTIFICATION NUMBER: [redacted]
VEHICLE PLATE NUMBER: [redacted]
STATE: OR YEAR: 14 MAKE & MODEL: SUBA SW

IF ADDITIONAL VEHICLES WERE INVOLVED IN THE ACCIDENT, USE ATTACHED *SUPPLEMENTAL REPORT* (Form 735-32B).

SECTION 5

DESCRIBE WHAT HAPPENED: (IF MORE SPACE IS NEEDED, SUBMIT ADDITIONAL PAGE)

Red CHEV stopped at red light. Silver SUBA (to left across intersection) making left did not turn jumped center divider turned & hit CHEV head on driver side

I certify all information given on this report is true and accurate to the best of my knowledge.

SIGNATURE OF PERSON MAKING REPORT (SEE SECTION 5): X [redacted]
PRINTED NAME OF PERSON MAKING REPORT: [redacted]
DAYTIME PHONE #: [redacted]
DATE SIGNED: 1/26/22

IF NOT DRIVER'S SIGNATURE, STATE RELATIONSHIP:
REASON DRIVER IS UNABLE TO SIGN REPORT:
PHONE NUMBER OF DRIVER: (   )

735-32 (6-19) **COMPLETE THE OTHER SIDE OF THIS PAGE**

DMV COPY

STK# 300009

YOU INTENDED TO...

☐ Go straight ahead
☐ Make right turn
☒ Make left turn
☐ Make "U" turn
☐ Back–Up
☐ Enter driveway (also mark left or right turn)
☒ Remain stopped in traffic
☐ Enter parked position
☐ Slow or Stop
☐ Leave driveway (also mark left or right turn)
☐ Start in traffic lane
☐ Leave parked position
☒ Remain parked
☐ Overtake and pass

YOUR VEHICLE

☒ Passenger car, pickup, van
☐ Military vehicle
☐ Taxicab
☐ Emergency vehicle
☐ Any of the above and trailer
☐ Private or public agency transit vehicle
☐ Bus
☐ School bus
☐ Other publicly-owned veh.
☐ Motorcycle
☐ Motor–scooter/bike
☐ Personal (assisted) mobility device
☐ Truck tractor & semi trailer
☐ Truck/truck tractor
☐ Other truck combination
☐ Farm tractor/farm equip.

WEATHER CONDITIONS

☒ Clear
☐ Raining
☐ Snowing
☐ Fog
☐ Other

ROAD SURFACE

☒ Dry
☐ Wet
☐ Snowy
☐ Icy
☐ Other

LIGHT CONDITIONS

☐ Daylight
☐ Dawn or dusk
☒ Darkness (lighted)
☐ Darkness (unlighted)
☐ Other

YOUR RESIDENCE

☒ Local resident (within 25 miles of accident site)
☐ Residing elsewhere in state
☐ Non–resident of this state:
  ☐ College student
  ☐ Military
  ☐ Temporary job

YOU WERE HEADED

☐ North ☐ East
☒ South ☐ West

On: Redwood Hwy
(name of street, road or route)

OTHER DRIVER WAS HEADED

☒ North ☐ East
☐ South ☐ West

On: Redwood Hwy
(name of street, road or route)

WITNESS INFORMATION:

Passengers: [redacted] (35 yo) [redacted]/86
[redacted] ([redacted]/18)

DRIVER AND PASSENGER INJURY AND SAFETY EQUIPMENT INFORMATION

SAFETY EQUIPMENT CODES
WRITE one of the codes (0–10) in column **C**

0 No seat belt available
1 Seat belt available but NOT used
2 Seat belt available and in use
3 Child restraint device available
4 Child restraint device in use
5 Child restraint device not available
6 Helmet NOT in use
7 Helmet in use
8 Air bag deployed
9 Air bag available - NOT deployed
10 Air bag NOT available

INJURY CODE FOR OCCUPANTS
WRITE one of the codes (1–5) in column **D**

1. Deceased as a result of the accident
2. Incapacitated - unconscious, could not walk, broken or distorted limbs, etc.
3. Visible injury - lump, abrasion cuts
4. Momentary unconsciousness, complaint of pain, nausea, limping
5. No apparent injury

SEX CODE
WRITE M, F or X in column **A**

SEAT POSITION	PASSENGER'S NAMES (your vehicle)	A	B	C		D
		SEX	AGE	SFTY EQP	AIR BAG	INJURY
DRIVER	[redacted]	F	36	2	9	3/4
FRONT CENTER						
FRONT RIGHT	[redacted]	M	35	2	9	3/4
MIDDLE* LEFT						
MIDDLE* CENTER						
MIDDLE* RIGHT						
REAR LEFT						
REAR CENTER	[redacted]	F	3	4	10	5
REAR RIGHT						

* Use only for vehicles with middle row of seats (i.e., vans, SUVs, etc.)

If this accident involved a pedestrian or bicyclist, complete the following:

☐ PEDESTRIAN NAME ☐ BICYCLIST NAME

Pedestrian or bicyclist was going:
☐ N ☐ S ☐ E ☐ W

ALONG OR ACROSS: (name of street, road or route)

From:

To:

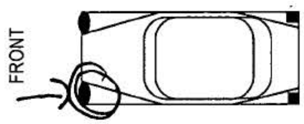
EXAMPLE: (From: NE corner To: SE corner (or) From: East side To: West side, etc.)

Sex and age of pedestrian / bicyclist:
☐ M ☐ F ☐ X Age: _____

Extent of pedestrian / bicyclist injury:
☐ Deceased
☐ Incapacitated
☐ Visible injury
☐ Momentary unconsciousness / complaint of pain
☐ No apparent injury

Pedestrian / bicyclist action: (mark one)
☐ Crossing at intersection or crosswalk
☐ Crossing **not** at intersection or crosswalk
☐ Walking / riding in roadway with traffic
☐ Walking / riding in roadway **against** traffic
☐ Standing in roadway
☐ Pushing or working on vehicles in roadway
☐ Other working in road
☐ Playing in road
☐ Hitchhiking
☐ Not in roadway
☐ Other__________ (specify)

Vehicle Damage



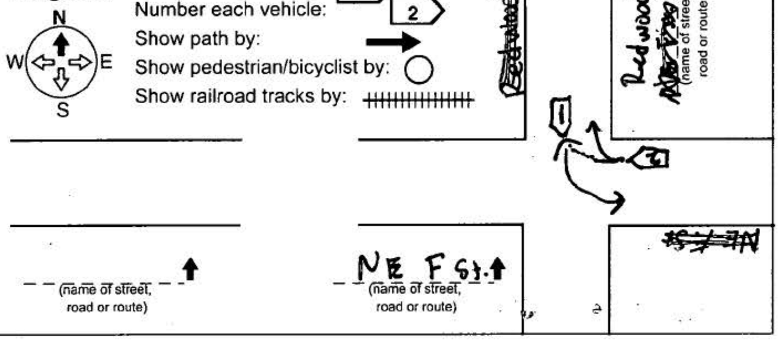
USE ARROW TO SHOW FIRST IMPACT (SHADE IN DAMAGED AREA)

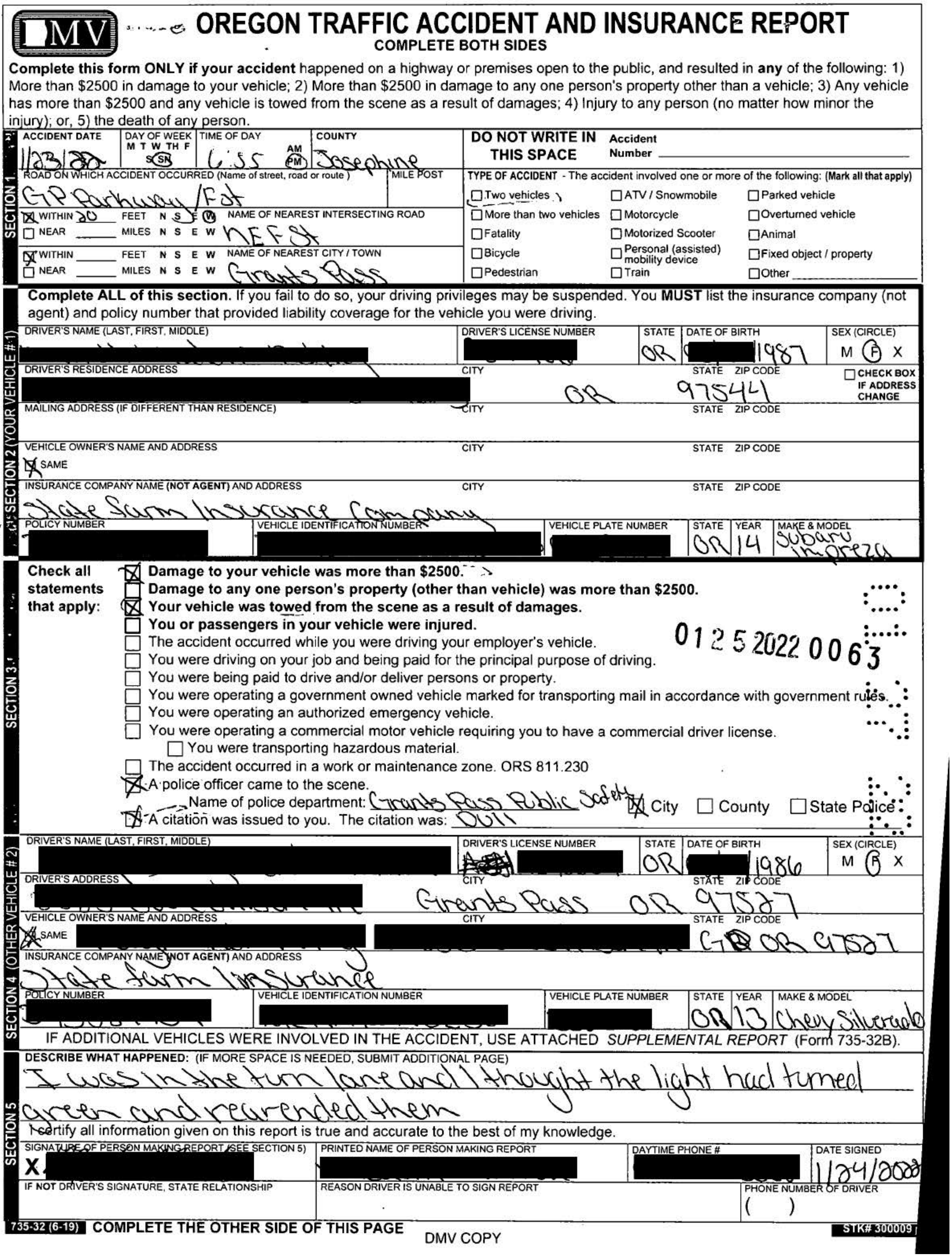
☒ Vehicle towed
☐ Rollover
☒ Under car
☐ Totaled
☒ Unknown

Your Vehicle (No. 1) damage: $ __________

Diagram

Number each vehicle: 1 2
Show path by: →
Show pedestrian/bicyclist by: ○
Show railroad tracks by: ++++++++++++





DMV

OREGON TRAFFIC ACCIDENT AND INSURANCE REPORT

COMPLETE BOTH SIDES

Complete this form ONLY if your accident happened on a highway or premises open to the public, and resulted in **any** of the following: 1) More than $2500 in damage to your vehicle; 2) More than $2500 in damage to any one person's property other than a vehicle; 3) Any vehicle has more than $2500 and any vehicle is towed from the scene as a result of damages; 4) Injury to any person (no matter how minor the injury); or, 5) the death of any person.

SECTION 1

ACCIDENT DATE: 1/23/22

DAY OF WEEK: M T W TH F S [✓ SN]

TIME OF DAY: 6:55 AM [✓ PM]

COUNTY: Josephine

DO NOT WRITE IN THIS SPACE Accident Number ____________

ROAD ON WHICH ACCIDENT OCCURRED (Name of street, road or route): GP Parkway / F St

MILE POST:

☒ WITHIN 20 FEET N S E [✓ W] NAME OF NEAREST INTERSECTING ROAD: NE F St

☐ NEAR ______ MILES N S E W

☒ WITHIN ______ FEET N S E W NAME OF NEAREST CITY / TOWN: Grants Pass

☐ NEAR ______ MILES N S E W

TYPE OF ACCIDENT - The accident involved one or more of the following: **(Mark all that apply)**

☐ Two vehicles	☐ ATV / Snowmobile	☐ Parked vehicle
☐ More than two vehicles	☐ Motorcycle	☐ Overturned vehicle
☐ Fatality	☐ Motorized Scooter	☐ Animal
☐ Bicycle	☐ Personal (assisted) mobility device	☐ Fixed object / property
☐ Pedestrian	☐ Train	☐ Other ______

SECTION 2 (YOUR VEHICLE #1)

Complete ALL of this section. If you fail to do so, your driving privileges may be suspended. You **MUST** list the insurance company (not agent) and policy number that provided liability coverage for the vehicle you were driving.

DRIVER'S NAME (LAST, FIRST, MIDDLE): [redacted]

DRIVER'S LICENSE NUMBER: [redacted]

STATE: OR

DATE OF BIRTH: [redacted] 1987

SEX (CIRCLE): M [✓ F] X

DRIVER'S RESIDENCE ADDRESS: [redacted]

CITY:

STATE: OR ZIP CODE: 97544

☐ CHECK BOX IF ADDRESS CHANGE

MAILING ADDRESS (IF DIFFERENT THAN RESIDENCE): CITY: STATE: ZIP CODE:

VEHICLE OWNER'S NAME AND ADDRESS: ☒ SAME CITY: STATE: ZIP CODE:

INSURANCE COMPANY NAME **(NOT AGENT)** AND ADDRESS: State Farm Insurance Company

CITY: STATE: ZIP CODE:

POLICY NUMBER: [redacted]

VEHICLE IDENTIFICATION NUMBER: [redacted]

VEHICLE PLATE NUMBER: [redacted]

STATE: OR YEAR: 14 MAKE & MODEL: Subaru Impreza

MC

SECTION 3

Check all statements that apply:

- ☒ **Damage to your vehicle was more than $2500.**
- ☐ **Damage to any one person's property (other than vehicle) was more than $2500.**
- ☒ **Your vehicle was towed from the scene as a result of damages.**
- ☐ **You or passengers in your vehicle were injured.**
- ☐ The accident occurred while you were driving your employer's vehicle.
- ☐ You were driving on your job and being paid for the principal purpose of driving.
- ☐ You were being paid to drive and/or deliver persons or property.
- ☐ You were operating a government owned vehicle marked for transporting mail in accordance with government rules.
- ☐ You were operating an authorized emergency vehicle.
- ☐ You were operating a commercial motor vehicle requiring you to have a commercial driver license.
  - ☐ You were transporting hazardous material.
- ☐ The accident occurred in a work or maintenance zone. ORS 811.230
- ☒ A police officer came to the scene.
  - Name of police department: Grants Pass Public Safety ☒ City ☐ County ☐ State Police
- ☒ A citation was issued to you. The citation was: DUII

01 25 2022 0063

SECTION 4 (OTHER VEHICLE # 2)

DRIVER'S NAME (LAST, FIRST, MIDDLE): [redacted]

DRIVER'S LICENSE NUMBER: [redacted]

STATE: OR

DATE OF BIRTH: [redacted] 1986

SEX (CIRCLE): M [✓ F] X

DRIVER'S ADDRESS: [redacted]

CITY: Grants Pass STATE: OR ZIP CODE: 97527

VEHICLE OWNER'S NAME AND ADDRESS: ☒ SAME [redacted] [redacted]

CITY: GP STATE: OR ZIP CODE: 97527

INSURANCE COMPANY NAME (NOT AGENT) AND ADDRESS: State Farm Insurance

POLICY NUMBER: [redacted]

VEHICLE IDENTIFICATION NUMBER: [redacted]

VEHICLE PLATE NUMBER: [redacted]

STATE: OR YEAR: 13 MAKE & MODEL: Chevy Silverado

IF ADDITIONAL VEHICLES WERE INVOLVED IN THE ACCIDENT, USE ATTACHED *SUPPLEMENTAL REPORT* (Form 735-32B).

SECTION 5

DESCRIBE WHAT HAPPENED: (IF MORE SPACE IS NEEDED, SUBMIT ADDITIONAL PAGE)

I was in the turn lane and I thought the light had turned green and rearended them

I certify all information given on this report is true and accurate to the best of my knowledge.

SIGNATURE OF PERSON MAKING REPORT (SEE SECTION 5): X [redacted]

PRINTED NAME OF PERSON MAKING REPORT: [redacted]

DAYTIME PHONE #: [redacted]

DATE SIGNED: 1/24/2022

IF NOT DRIVER'S SIGNATURE, STATE RELATIONSHIP:

REASON DRIVER IS UNABLE TO SIGN REPORT:

PHONE NUMBER OF DRIVER: (   )

735-32 (6-19) **COMPLETE THE OTHER SIDE OF THIS PAGE**

DMV COPY

STK# 300009

YOU INTENDED TO...

☐ Go straight ahead
☐ Make right turn
☒ Make left turn
☐ Make "U" turn
☐ Back–Up
☐ Enter driveway (also mark left or right turn)
☐ Remain stopped in traffic
☐ Enter parked position
☐ Slow or Stop
☐ Leave driveway (also mark left or right turn)
☐ Start in traffic lane
☐ Leave parked position
☐ Remain parked
☐ Overtake and pass

YOUR VEHICLE

☒ Passenger car, pickup, van
☐ Military vehicle
☐ Taxicab
☐ Emergency vehicle
☐ Any of the above and trailer
☐ Private or public agency transit vehicle
☐ Bus
☐ School bus
☐ Other publicly-owned veh.
☐ Motorcycle
☐ Motor–scooter/bike
☐ Personal (assisted) mobility device
☐ Truck tractor & semi trailer
☐ Truck/truck tractor
☐ Other truck combination
☐ Farm tractor/farm equip.

WEATHER CONDITIONS

☒ Clear
☐ Raining
☐ Snowing
☐ Fog
☐ Other

ROAD SURFACE

☒ Dry
☐ Wet
☐ Snowy
☐ Icy
☐ Other

LIGHT CONDITIONS

☐ Daylight
☐ Dawn or dusk
☐ Darkness (lighted)
☒ Darkness (unlighted)
☐ Other

YOUR RESIDENCE

☒ Local resident (within 25 miles of accident site)
☐ Residing elsewhere in state
☐ Non–resident of this state:
  ☐ College student
  ☐ Military
  ☐ Temporary job

YOU WERE HEADED

☐ North ☐ East
☐ South ☒ West

On: GP Pkwy
(name of street, road or route)

OTHER DRIVER WAS HEADED

☐ North ☐ East
☐ South ☒ West

On: ~~GP~~ PKWY Parkway
(name of street, road or route)

WITNESS INFORMATION:

[redacted]

[redacted]

DRIVER AND PASSENGER INJURY AND SAFETY EQUIPMENT INFORMATION

SAFETY EQUIPMENT CODES
WRITE one of the codes (0–10) in column **C**

0 No seat belt available
1 Seat belt available but NOT used
2 Seat belt available and in use
3 Child restraint device available
4 Child restraint device in use
5 Child restraint device not available
6 Helmet NOT in use
7 Helmet in use
8 Air bag deployed
9 Air bag available - NOT deployed
10 Air bag NOT available

INJURY CODE FOR OCCUPANTS
WRITE one of the codes (1–5) in column **D**

1. Deceased as a result of the accident
2. Incapacitated - unconscious, could not walk, broken or distorted limbs, etc.
3. Visible injury - lump, abrasion cuts
4. Momentary unconsciousness, complaint of pain, nausea, limping
5. No apparent injury

SEX CODE
WRITE M, F or X in column **A**

SEAT POSITION	PASSENGER'S NAMES (your vehicle)	A	B	C		D
		SEX	AGE	SFTY EQP	AIR BAG	INJURY
DRIVER	[redacted]	F	34	2	8	5
FRONT CENTER						
FRONT RIGHT						
MIDDLE* LEFT						
MIDDLE* CENTER						
MIDDLE* RIGHT						
REAR LEFT						
REAR CENTER						
REAR RIGHT						

* Use **only** for vehicles with middle row of seats (i.e., vans, SUVs, etc.)

If this accident involved a pedestrian or bicyclist, complete the following:

☐ **PEDESTRIAN NAME** ☐ **BICYCLIST NAME**

Pedestrian or bicyclist was going: ☐ N ☐ S ☐ E ☐ W

ALONG OR ACROSS: (name of street, road or route)

From:

To:

EXAMPLE: (From: NE corner To: SE corner (or) From: East side To: West side, etc.)

Sex and age of pedestrian / bicyclist:
☐ M ☐ F ☐ X Age: ____

Extent of pedestrian / bicyclist injury:
☐ Deceased
☐ Incapacitated
☐ Visible injury
☐ Momentary unconsciousness / complaint of pain
☐ No apparent injury

Pedestrian / bicyclist action: (mark one)
☐ Crossing at intersection or crosswalk
☐ Crossing **not** at intersection or crosswalk
☐ Walking / riding in roadway with traffic
☐ Walking / riding in roadway **against** traffic
☐ Standing in roadway
☐ Pushing or working on vehicles in roadway
☐ Other working in road
☐ Playing in road
☐ Hitchhiking
☐ Not in roadway
☐ Other ____________ (specify)

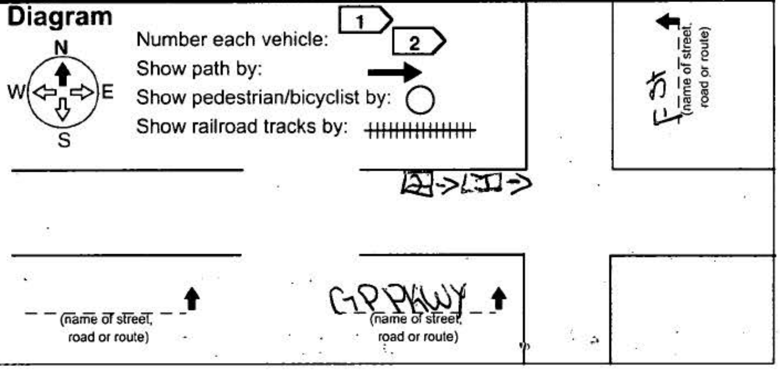
Vehicle Damage

USE ARROW TO SHOW FIRST IMPACT (SHADE IN DAMAGED AREA)

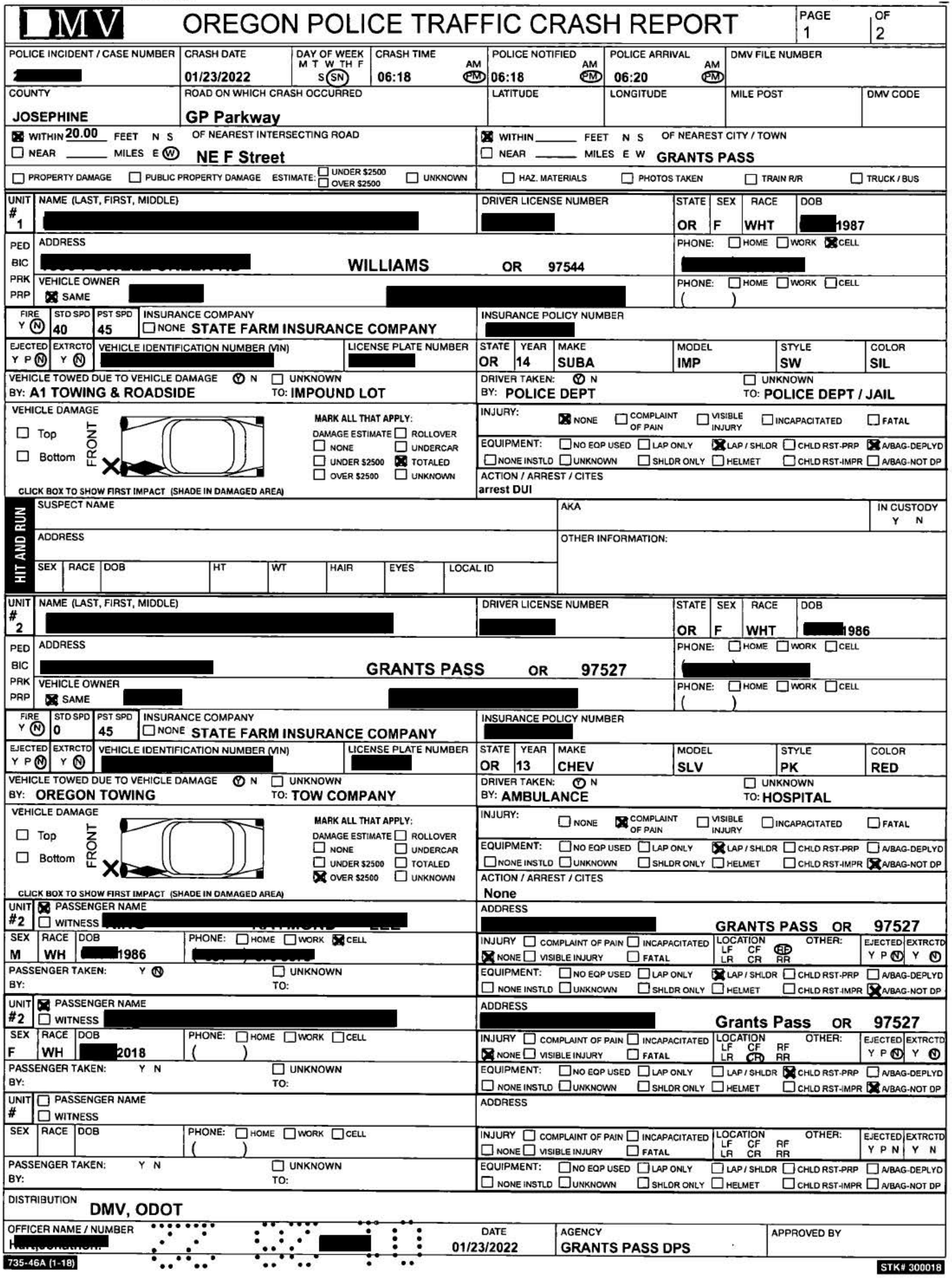
☐ Vehicle towed
☐ Rollover
☐ Under car
☒ Totaled
☐ Unknown

Your Vehicle (No. 1) damage: $ ________

Diagram



Number each vehicle:
Show path by:
Show pedestrian/bicyclist by:
Show railroad tracks by:



DMV **OREGON POLICE TRAFFIC CRASH REPORT**

PAGE 1 OF 2

POLICE INCIDENT / CASE NUMBER [redacted]	CRASH DATE 01/23/2022	DAY OF WEEK M T W TH F S [✓ SN]	CRASH TIME 06:18 AM [✓ PM]	POLICE NOTIFIED 06:18 AM [✓ PM]	POLICE ARRIVAL 06:20 AM [✓ PM]	DMV FILE NUMBER
COUNTY JOSEPHINE	ROAD ON WHICH CRASH OCCURRED GP Parkway			LATITUDE	LONGITUDE	MILE POST / DMV CODE

☒ WITHIN 20.00 FEET N S ☐ NEAR ____ MILES E [✓ W] OF NEAREST INTERSECTING ROAD **NE F Street**

☒ WITHIN ____ FEET N S ☐ NEAR ____ MILES E W OF NEAREST CITY / TOWN **GRANTS PASS**

☐ PROPERTY DAMAGE ☐ PUBLIC PROPERTY DAMAGE ESTIMATE: ☐ UNDER $2500 ☐ OVER $2500 ☐ UNKNOWN ☐ HAZ. MATERIALS ☐ PHOTOS TAKEN ☐ TRAIN R/R ☐ TRUCK / BUS

UNIT # 1
NAME (LAST, FIRST, MIDDLE): [redacted]
DRIVER LICENSE NUMBER: [redacted]
STATE: OR SEX: F RACE: WHT DOB: [redacted]1987
PED BIC PRK PRP
ADDRESS: [redacted] WILLIAMS OR 97544
PHONE: ☐ HOME ☐ WORK ☒ CELL [redacted]
VEHICLE OWNER ☒ SAME [redacted] [redacted]
PHONE: ☐ HOME ☐ WORK ☐ CELL ( )
FIRE Y [✓ N] STD SPD 40 PST SPD 45
INSURANCE COMPANY ☐ NONE **STATE FARM INSURANCE COMPANY**
INSURANCE POLICY NUMBER: [redacted]
EJECTED Y P [✓ N] EXTRCTD Y [✓ N]
VEHICLE IDENTIFICATION NUMBER (VIN): [redacted]
LICENSE PLATE NUMBER: [redacted]
STATE: OR YEAR: 14 MAKE: SUBA MODEL: IMP STYLE: SW COLOR: SIL
VEHICLE TOWED DUE TO VEHICLE DAMAGE [✓ Y] N ☐ UNKNOWN
BY: **A1 TOWING & ROADSIDE** TO: **IMPOUND LOT**
DRIVER TAKEN: [✓ Y] N ☐ UNKNOWN
BY: **POLICE DEPT** TO: **POLICE DEPT / JAIL**
VEHICLE DAMAGE ☐ Top ☐ Bottom FRONT
MARK ALL THAT APPLY: DAMAGE ESTIMATE ☐ NONE ☐ UNDER $2500 ☐ OVER $2500 ☐ ROLLOVER ☐ UNDERCAR ☒ TOTALED ☐ UNKNOWN
CLICK BOX TO SHOW FIRST IMPACT (SHADE IN DAMAGED AREA)
INJURY: ☒ NONE ☐ COMPLAINT OF PAIN ☐ VISIBLE INJURY ☐ INCAPACITATED ☐ FATAL
EQUIPMENT: ☐ NO EQP USED ☐ LAP ONLY ☒ LAP / SHLDR ☐ CHLD RST-PRP ☒ A/BAG-DEPLYD ☐ NONE INSTLD ☐ UNKNOWN ☐ SHLDR ONLY ☐ HELMET ☐ CHLD RST-IMPR ☐ A/BAG-NOT DP
ACTION / ARREST / CITES: arrest DUI

HIT AND RUN
SUSPECT NAME: AKA: IN CUSTODY Y N
ADDRESS: OTHER INFORMATION:
SEX RACE DOB HT WT HAIR EYES LOCAL ID

UNIT # 2
NAME (LAST, FIRST, MIDDLE): [redacted]
DRIVER LICENSE NUMBER: [redacted]
STATE: OR SEX: F RACE: WHT DOB: [redacted]1986
PED BIC PRK PRP
ADDRESS: [redacted] GRANTS PASS OR 97527
PHONE: ☐ HOME ☐ WORK ☐ CELL [redacted]
VEHICLE OWNER ☒ SAME [redacted] [redacted]
PHONE: ☐ HOME ☐ WORK ☐ CELL ( )
FIRE Y [✓ N] STD SPD 0 PST SPD 45
INSURANCE COMPANY ☐ NONE **STATE FARM INSURANCE COMPANY**
INSURANCE POLICY NUMBER: [redacted]
EJECTED Y P [✓ N] EXTRCTD Y [✓ N]
VEHICLE IDENTIFICATION NUMBER (VIN): [redacted]
LICENSE PLATE NUMBER: [redacted]
STATE: OR YEAR: 13 MAKE: CHEV MODEL: SLV STYLE: PK COLOR: RED
VEHICLE TOWED DUE TO VEHICLE DAMAGE [✓ Y] N ☐ UNKNOWN
BY: **OREGON TOWING** TO: **TOW COMPANY**
DRIVER TAKEN: [✓ Y] N ☐ UNKNOWN
BY: **AMBULANCE** TO: **HOSPITAL**
VEHICLE DAMAGE ☐ Top ☐ Bottom FRONT
MARK ALL THAT APPLY: DAMAGE ESTIMATE ☐ NONE ☐ UNDER $2500 ☒ OVER $2500 ☐ ROLLOVER ☐ UNDERCAR ☐ TOTALED ☐ UNKNOWN
CLICK BOX TO SHOW FIRST IMPACT (SHADE IN DAMAGED AREA)
INJURY: ☐ NONE ☒ COMPLAINT OF PAIN ☐ VISIBLE INJURY ☐ INCAPACITATED ☐ FATAL
EQUIPMENT: ☐ NO EQP USED ☐ LAP ONLY ☒ LAP / SHLDR ☐ CHLD RST-PRP ☐ A/BAG-DEPLYD ☐ NONE INSTLD ☐ UNKNOWN ☐ SHLDR ONLY ☐ HELMET ☐ CHLD RST-IMPR ☒ A/BAG-NOT DP
ACTION / ARREST / CITES: None

UNIT #2 ☒ PASSENGER NAME ☐ WITNESS [redacted]
SEX: M RACE: WH DOB: [redacted]1986
PHONE: ☐ HOME ☐ WORK ☒ CELL [redacted]
PASSENGER TAKEN: Y [✓ N] ☐ UNKNOWN
BY: TO:
ADDRESS: [redacted] **GRANTS PASS OR 97527**
INJURY ☐ COMPLAINT OF PAIN ☐ INCAPACITATED ☒ NONE ☐ VISIBLE INJURY ☐ FATAL
LOCATION LF CF [✓ RF] LR CR RR OTHER:
EJECTED Y P [✓ N] EXTRCTD Y [✓ N]
EQUIPMENT: ☐ NO EQP USED ☐ LAP ONLY ☒ LAP / SHLDR ☐ CHLD RST-PRP ☐ A/BAG-DEPLYD ☐ NONE INSTLD ☐ UNKNOWN ☐ SHLDR ONLY ☐ HELMET ☐ CHLD RST-IMPR ☒ A/BAG-NOT DP

UNIT #2 ☒ PASSENGER NAME ☐ WITNESS [redacted]
SEX: F RACE: WH DOB: [redacted]2018
PHONE: ☐ HOME ☐ WORK ☐ CELL ( )
PASSENGER TAKEN: Y N ☐ UNKNOWN
BY: TO:
ADDRESS: [redacted] **Grants Pass OR 97527**
INJURY ☐ COMPLAINT OF PAIN ☐ INCAPACITATED ☒ NONE ☐ VISIBLE INJURY ☐ FATAL
LOCATION LF CF RF LR [✓ CR] RR OTHER:
EJECTED Y P [✓ N] EXTRCTD Y [✓ N]
EQUIPMENT: ☐ NO EQP USED ☐ LAP ONLY ☐ LAP / SHLDR ☒ CHLD RST-PRP ☐ A/BAG-DEPLYD ☐ NONE INSTLD ☐ UNKNOWN ☐ SHLDR ONLY ☐ HELMET ☐ CHLD RST-IMPR ☒ A/BAG-NOT DP

UNIT # ☐ PASSENGER NAME ☐ WITNESS
SEX RACE DOB
PHONE: ☐ HOME ☐ WORK ☐ CELL ( )
PASSENGER TAKEN: Y N ☐ UNKNOWN
BY: TO:
ADDRESS:
INJURY ☐ COMPLAINT OF PAIN ☐ INCAPACITATED ☐ NONE ☐ VISIBLE INJURY ☐ FATAL
LOCATION LF CF RF LR CR RR OTHER:
EJECTED Y P N EXTRCTD Y N
EQUIPMENT: ☐ NO EQP USED ☐ LAP ONLY ☐ LAP / SHLDR ☐ CHLD RST-PRP ☐ A/BAG-DEPLYD ☐ NONE INSTLD ☐ UNKNOWN ☐ SHLDR ONLY ☐ HELMET ☐ CHLD RST-IMPR ☐ A/BAG-NOT DP

DISTRIBUTION: **DMV, ODOT**

OFFICER NAME / NUMBER: [redacted] [redacted]
DATE: 01/23/2022
AGENCY: **GRANTS PASS DPS**
APPROVED BY:

735-46A (1-18)

STK# 300018

POLICE INCIDENT / CASE NUMBER	EMS NOTIFIED	EMS ARRIVAL	LOCAL CODES					PAGE	OF
[redacted]	06:18 [✓ AM] PM	06:25 AM [✓ PM]	A	B	C	D	E	2	2

Check ONE box in all categories. Check ALL boxes that apply in categories with (★).

FIRST HARMFUL EVENT

NON COLLISION
- ☐ OVERTURN
- ☐ FIRE / EXPLOSION
- ☐ IMMERSION
- ☐ GAS INHALATION
- ☐ OTHER NON COLLISION
- ☐ MEDICAL (Explain)

COLLISION WITH
- ☐ PEDESTRIAN
- ☐ PARKED MOTOR VEHICLE
- ☐ RAILWAY TRAIN
- ☐ BICYCLIST

CRASH TYPE
- ☒ HEAD ON
- ☐ REAR END
- ☐ ANGLE
- ☐ SIDESWIPE
- ☐ MANNER UNKNOWN

FIXED OBJECT
- ☐ BARRICADE
- ☐ BOULDER / ROCK
- ☐ BRIDGE O/PASS or RAILING
- ☐ BUILDING
- ☐ CULVERT HEADWALL
- ☐ CURBING
- ☐ DITCH
- ☐ DIVIDER - CNCRT or STEEL
- ☐ FENCE - NOT MEDIAN
- ☐ FIRE HYDRANT
- ☐ HIGHWAY GUARDRAIL
- ☐ HIGHWAY SIGN
- ☐ IMPACT ABSORBER
- ☐ LIGHT STANDARD
- ☐ MAILBOX
- ☐ OVERHEAD SIGN POST
- ☐ OVERHEAD STRUCTURE
- ☐ PIER or COLUMN
- ☐ RETAINING WALL
- ☐ SIDESLOPE EARTH
- ☐ SIDESLOPE ROCK or STONE
- ☐ TRAFFIC SIGNAL POST
- ☐ TREE
- ☐ UNDERPASS TUNNEL
- ☐ UTILITY POLE
- ☐ OTHER FIXED (Explain)

OTHER OBJECT (NOT FIXED)
- ☐ ANIMAL
- ☐ THROWN / FALLING OBJECT
- ☐ UNKNOWN
- ☐ OTHER OBJECT (Explain)

EVENT LOCATION

ON ROADWAY
- ☐ NON-INTERSECTION
- ☐ INTERSECTION
- ☒ INTERSECTION RELATED
- ☐ DRIVEWAY ACCESS
- ☐ INTERCHANGE AREA
- ☐ RAILROAD CROSSING
- ☐ BRIDGE
- ☐ TUNNEL
- ☐ OTHER ON-ROAD AREA

OFF ROADWAY
- ☐ SHOULDER
- ☐ TURNOUT
- ☐ ROADSIDE
- ☐ BEYOND RIGHT OF WAY
- ☐ MEDIAN
- ☐ DRIVEWAY
- ☐ PRIVATE DRIVE
- ☐ RAILROAD CROSSING
- ☐ OTHER OFF ROAD
- ☐ PARKING LOT
- ☐ UNKNOWN

SPECIAL ZONE
- ☒ NONE
- ☐ CONSTRUCTION
- ☐ MAINTENANCE-ORS 811.230
- ☐ UTILITY
- ☐ SNOW
- ☐ SCHOOL
- ☐ UNKNOWN WORK
- ☐ OTHER

WEATHER
- ☒ CLEAR
- ☐ CLOUDY (OVERCAST)
- ☐ RAIN
- ☐ SNOW
- ☐ SLEET / HAIL / ETC.
- ☐ FOG / SMOG
- ☐ SMOKE
- ☐ BLOWING SAND / DIRT
- ☐ SEVERE CROSSWIND
- ☐ OTHER / UNKNOWN

SURFACE CONDITION

#1	#2	
☒	☒	DRY
☐	☐	WET
☐	☐	SNOW / SLUSH
☐	☐	ICY
☐	☐	MUDDY
☐	☐	DEBRIS
☐	☐	RUTS / HOLES / BUMPS
☐	☐	WORN / POLISHED
☐	☐	LOW / SOFT SHOULDER
☐	☐	OTHER (Explain)

SURFACE TYPE

#1	#2	
☐	☐	CONCRETE
☒	☒	BLACKTOP / ASPHALT
☐	☐	GRAVEL
☐	☐	DIRT
☐	☐	OTHER

LIGHT
- ☐ FULL DAYLIGHT
- ☐ DAWN
- ☐ DUSK
- ☒ DARK - LIGHTED WAY
- ☐ DARK - NOT LIGHTED
- ☐ UNKNOWN

TRAFFIC CONTROL TYPE

#1	#2	
☐	☐	NONE
☐	☐	SCHOOL BUS LIGHTS
☐	☐	OFFICER / CROSSING GUARD or FLAGGER
☒	☒	TRAFFIC SIGNAL w/ PEDESTRIAN CONTROL
☐	☐	TRAFFIC SIGNAL
☐	☐	FLASHING BEACON
☐	☐	STOP SIGN
☐	☐	YIELD SIGN
☐	☐	RR CROSSING GATES
☐	☐	RR CROSSING BUCKS
☐	☐	RR FLASHING SIGNAL
☐	☐	RR CROSSING w/ PAVEMENT MARKINGS
☐	☐	LANE CONTRLS / LINES / STRIPES / DEVICES
☐	☐	SCHOOL SIGNAL
☐	☐	OTHER REG SIGN
☐	☐	TURN LANES
☐	☐	UNKNOWN

TRAFFIC CONTROL DEVICE CONDITION

#1	#2	
☒	☒	NO MALFUNCTION
☐	☐	DOWN / MISSING
☐	☐	TURNED FROM PROPER POSITION
☐	☐	OBSCURED BY OTHER SIGNS
☐	☐	OBSCURED BY PARKED VEHICLE
☐	☐	OBSCURED BY VEGETATION
☐	☐	LIGHTS MALFUNCTION
☐	☐	LIGHTS STUCK
☐	☐	GATES INOPERATIVE
☐	☐	GATE ARM MISSING
☐	☐	OTHER RR MALFUNCTN
☐	☐	OTHER IMPAIRMENT
☐	☐	UNKNOWN

ROAD CHARACTER

#1	#2	
☐	☐	STRAIGHT and LEVEL
☐	☐	STRAIGHT w/ GRADE
☐	☐	CURVED and LEVEL
☒	☒	CURVED w/ GRADE

VEH #1 2 NUMBER OF LANES

VEH #2 1 NUMBER OF LANES

2 TOTAL NUMBER OF LANES

ROAD FLOW

#1	#2	
☒	☒	ONE WAY TRAFFIC
☐	☐	NOT PHYSLY DIVIDED

MEDIAN TYPE

#1	#2	
☐	☐	UNPAVED
☐	☐	BARRIER
☒	☒	PAVED
☐	☐	CONT LEFT TURN

DRIVER LICENSE VIOLATION

DRIVER #1	#2	
☒	☒	NONE
☐	☐	INSTRUCTION PERMIT
☐	☐	LICENSE RESTRICTION
☐	☐	EXPIRED LICENSE
☐	☐	OUT OF CLASS
☐	☐	SUSPENDED / REVOKED
☐	☐	UNLICENSED

★ DRIVER FACTORS

DRIVER #1	#2	
☐	☒	NONE
☐	☐	CELL PHONE USE
☐	☐	OBSTRUCTED VIEW
☐	☐	FAILED TO YIELD ROW
☐	☐	DISRGRD TRAF SIGN
☐	☐	TOO FAST FOR COND
☐	☐	MADE IMPROPER TURN
☐	☐	WRONG SIDE / WAY
☐	☐	FOLLOW TOO CLOSELY
☐	☐	IMPROPER LANE CHNG
☐	☐	IMPROPER BACKING
☐	☐	IMPROPER PASSING
☐	☐	IMPROPER SIGNAL
☐	☐	IMPROPER PARKING
☐	☐	FATIGUE / DROWSY
☐	☐	ILL
☐	☐	BLACKOUT
☐	☐	INATTENTIVE
☐	☐	DISTRACTED
☐	☐	UNKNOWN
☐	☐	IMPRP RESTR EQP USE
☒	☐	OTHER (Explain)

intox

★ IMPAIRMENT

DRIVER #1	#2	
☐	☒	NONE
☐	☐	UNDER INFL-DRUGS
☒	☐	UNDER INFL-ALCOHOL
☐	☐	UNDER INFL-MEDS
☐	☐	UNDER INFL-MARIJUANA
☐	☐	UNKNOWN

DETERMINED BY:

☒	☐	INTOXILYZER TEST
☐	☐	BLOOD OR URINE TEST
☒	☐	FIELD SOB. TEST
☒	☐	OBSERVED (SPEECH, ODOR, ETC.)
☐	☐	DRE EVALUATION
☐	☒	STATEMENTS
☐	☐	UNKNOWN
☐	☐	OTHER (Explain)

RESULTS OF TEST

D1 .24 % D2 ____ %

☐	☐	NO TEST GIVEN
☐	☐	TEST REFUSED
☐	☐	TESTED FOR DRUGS
☐	☐	RESULTS NOT AVAILBLE

★VEH RELATED FACTORS

#1	#2	
☒	☒	NONE
☐	☐	BRAKES
☐	☐	STEERING
☐	☐	POWER PLANT
☐	☐	SUSPENSION
☐	☐	TIRES
☐	☐	EXHAUST
☐	☐	LIGHTS
☐	☐	SIGNALS
☐	☐	WINDOWS / WINDSHLD
☐	☐	RESTRAINT SYSTEM
☐	☐	WHEELS
☐	☐	COUPLING
☐	☐	CARGO
☐	☐	OTHER

VEHICLE MOVEMENT

#1	#2	
☐	☐	BACKING
☐	☒	STOPPED
☐	☐	STRAIGHT AHEAD
☐	☐	TURNING RIGHT
☐	☐	TURNING LEFT
☐	☐	MAKING U-TURN
☐	☐	ENTER TRAFFIC LANE
☐	☐	LEAVE TRAFFIC LANE
☐	☐	OVERTAKING
☐	☐	CHANGING LANES
☐	☐	AVOIDING MANEUVER
☐	☐	MERGING
☐	☐	PARKING
☒	☐	NEGOTIATING A CURVE
☐	☐	OTHER

TRAILER TYPE

#1	#2	
☐	☐	LOG BUNK
☐	☐	SEMITRAILER
☐	☐	POLE TRAILER
☐	☐	FULL TRAILER
☐	☐	MOBILE HOME
☐	☐	UTILITY TRAILER
☐	☐	TRAVEL TRAILER
☐	☐	BOAT TRAILER
☐	☐	FARM EQUIPMENT
☐	☐	HORSE TRAILER
☐	☐	VEHICLE IN TOW
☐	☐	OTHER / UNKNOWN

TRUCK CONFIGURATION

#1	#2	
☐	☐	TRUCK (2 or 3 AXLE)
☐	☐	TRUCK / TRACTOR-SEMI
☐	☐	TRUCK and TRAILER
☐	☐	DOUBLE TRAILERS
☐	☐	TRIPLE TRAILERS
☐	☐	DROMEDARY and SEMI
☐	☐	HEAVY HAUL CONFIG
☐	☐	BUS
☐	☐	OTHER (Explain)

★ PASSENGER FACTORS

PASS UNIT #1

#1	#2	
☒	☐	NONE
☐	☐	INTERFERED w/DRIVER
☐	☐	UNDER INFL-DRUGS
☐	☐	UNDER INFL-ALCOHOL
☐	☐	UNKNOWN
☐	☐	IMPRP RESTR EQP USE
☐	☐	OTHER (Explain)

PASS UNIT #2

#1	#2	
☒	☒	NONE
☐	☐	INTERFERED w/DRIVER
☐	☐	UNDER INFL-DRUGS
☐	☐	UNDER INFL-ALCOHOL
☐	☐	UNKNOWN
☐	☐	IMPRP RESTR EQP USE
☐	☐	OTHER (Explain)

PEDESTRIAN LOCATION

IN ROAD
- ☐ IN X-WALK
- ☐ NOT IN X-WALK
- ☐ NO X-WALK AVAILABLE

INTERSECTION
- ☐ IN X-WALK
- ☐ NOT IN X-WALK
- ☐ NO X-WALK AVAILABLE

OTHER
- ☐ NOT IN ROADWAY
- ☐ SHOULDER
- ☐ MEDIAN
- ☐ BIKE LANE
- ☐ UNKNOWN

PEDESTRIAN TYPE
- ☒ NONE
- ☐ PEDESTRIAN
- ☐ BICYCLIST
- ☐ CONVEYANCE
- ☐ WHEEL CHAIR
- ☐ ANIMAL RIDER
- ☐ RIDER of ANIM DRAWN VEH
- ☐ UNKNOWN
- ☐ OTHER (Explain)

★ PEDESTRIAN ACTION
- ☐ ENTER / CROSS ROAD
- ☐ WALK / RIDE w/TRAFF
- ☐ WALK / RIDE AGAINST
- ☐ STEP ON / OFF VEHICLE
- ☐ STEP ON / OFF SCH BUS
- ☐ APPRCH / LEAVE SC BUS
- ☐ APPROACH / LEAVE VEH
- ☐ WORK / PUSHING VEHICLE
- ☐ OTHER WORKING
- ☐ PLAYING
- ☐ STANDING
- ☐ LYING DOWN
- ☐ UNKNOWN

PED / BIKE VISIBILITY

CLOTHING
- ☐ NO CONTRACT w/BKGRND
- ☐ CONTRASTED w/BKGRND
- ☐ REFLECTIVE

OTHER
- ☐ OTHER LIGHT SOURCE
- ☐ UNKNOWN

★ PED / BIKE FACTORS
- ☒ NONE
- ☐ FAILED TO YIELD ROW
- ☐ DISREGARD TRAFFIC SIGN
- ☐ ILLEGALLY IN ROAD
- ☐ EQUIPMENT VIOLATION
- ☐ CLOTHING NOT VISIBLE
- ☐ UNDER INFL-DRUGS
- ☐ UNDER INFL-ALCOHOL
- ☐ INATTENTIVE
- ☐ DISTRACTED
- ☐ CELL PHONE
- ☐ UNKNOWN
- ☐ OTHER (Explain)

North

SKETCH & NARRATIVE

(NOT TO SCALE)

UNIT		#1	#2
SKID MARKS TO	(FEET)		
DISTANCE AFTER	(FEET)		

Vehicle One operated by [redacted]ailed to negotiate the curve while West bound at GP Parkway and NE F Street. Her vehicle struck Vehicle Two head on being operated by [redacted] who was stopped in the seat to north turn lane from GP Parkway to NE F Street. Both vehicles were unable to be driven. Vehicle One towed by A-1 to impound lot and Veh 2 was towed by Oregon Towing, Driver One was placed in custody. DMV Crash forms completed.