# *Quarterly Progress Report (QPR)*

# *Applications of Enterprise GIS in Transportation*

**Progress Report for Quarter 11 [April 1st, 2022 – Jun 30st, 2022]**

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Map

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Background

The Pooled Fund Study (PFS) on Applications of Enterprise GIS in Transportation (AEGIST) was initiated by FHWA in 2018. During Phase 1 of this study a guidebook was developed for transportation agencies in the United States, with the primary objective of documenting guidance on how spatial and linear referenced data should be managed by States. Phase 2 of this PFS was initiated in October 2019. This phase will span over 5 years (October 2019 – September 2024), during which the objectives outlined below would be accomplished.

Objectives

* Establish a standard for managing and governing data in spatial and linear referencing systems at transportation agencies, including but not limited to routes, intersections, interchanges, roundabouts, road segments, roadway characteristics, infrastructure assets, model inventory of roadway elements (MIRE), HPMS data items and ARNOLD road network.
* Develop guidance for States for modeling spatial transportation data, especially linear referencing system (LRS) data. Importing, exporting & conflating road network and roadway characteristics data across DOT LRS and Federal, State and Local data systems.
* Conduct a series of webinars, workshops, peer exchange meetings and provide consulting services to the States participating in the pooled fund to develop national standards in data modeling and management; enhance existing enterprise GIS systems at these agencies.
* Update the AEGIST Guidebook that was prepared in Phase 1 by documenting best practices, patterns and similarities across agencies in managing spatial data using enterprise data systems, including but not limited to Asset Management Systems, Traffic and Safety Systems, Project Planning and Programming Systems, Design and Construction Systems, and GIS and Linear Referencing Systems (LRS).
* Collaborate with States to enhance and develop spatial data management systems, processes, platforms to establish a structured and systematic approach for management of spatial data. This would involve establishing spatial data governance systems, business rules, applications, tools and platforms for:
  + Spatial Data Modeling
  + Spatial Data Integration and Engineering
  + Spatial Data Analytics

Completion Status and Summary

Time Frame: October 1, 2019 to September 30, 2024

Total Time, months: 60

Time Expended, months: 33

Percent Calendar Time Expended: 55%

Percent Complete for Tasks & Sub-Tasks:

|  |  |  |
| --- | --- | --- |
| **Base Period** | | |
| **Tasks** | **Sub-Tasks** | **Percent Complete** |
| Task 1: Project Management | 1.  Quarterly Meetings & Technical Tasks Planning | **100%** |
| 2.  Quarterly Status Reports |
| Task 2: Technical Services | 1.   Connecticut - **77%** | **63%** |
| 2.   Idaho - **77%** |
| 3.   Tennessee - **62%** |
| 4. California - **62%** |
| 5. Pennsylvania - **46%** |
| 6. Ohio - **54%** |
| Cross-Agency Activities: Guidebook Development - **67%** |
| Task 3: Workshops, Webinars, Presentations | 1. Webinar 1: Data Governance 2. Workshops: GIS-T 2019 and GIS-T 2021 3. Presentations 2020 and 2021 4. Flyers, Events Site Updates | **100%** |
| Task 4: Member State Meetings | 1.  Member State Meeting 1 – 2019  2. Member State Meeting 2 – 2020 | **100%** |
| Task 5: HPMS 9.0 Recommendations | Road Network Data Architecture  Data Modeling Standards, Use Cases, Topology | **100%** |

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| --- | --- | --- |
| **Performance Period 1** | | |
| **Tasks** | **Sub-Tasks** | **Percent Complete** |
| Task 1: Project Management | 1.  Quarterly Meetings & Technical Tasks Planning | **55%** |
| 2.  Quarterly Status Reports |
| Task 2: Technical Services | 1.   New Mexico – **0%** | **3%** |
| 2.   Washington – 1**%** |
| 3.   Florida – **0%** |
| 4. North Carolina **– 10%** |
| 5. Kansas **– 10%** |
| 6. Georgia **– 0%** |
| 7. Massachusetts **– 0%** |
| Cross-Agency Activities: Guidebook Development **- 0%** |
| Task 3: Workshops, Webinars, Presentations | 1. Workshops: GIS-T 2022 and GIS-T-2023 2. Presentations 2022 and 2023 3. Flyers, Events Site Updates | **22%** |
| Task 4: Member State Meetings | 1.  Member State Meeting 1 – 2022  2. Member State Meeting 2 – 2023 | **0%** |

Work Accomplished This Reporting Period: April – June, 2022

**Task 1: Project Management**

**Task Objective**: Perform project management activities, which include conducting monthly status meetings, developing quarterly status reports, creating project work plan, managing project resources, schedule, deliverables and communication with all stakeholders.

**Activities**:

1. Prepared and delivered AEGIST Quarterly Report #10 for the period Jan – Mar, 2022.
2. Prepared for the quarterly meeting with PFS States on July 21, 2022 to share updates on AEGIST activities.
3. Technical services tasks managed for following PFS States: Connecticut, Idaho, Tennessee, California, Pennsylvania, Ohio, North Carolina, Kansas, Washington. Details provided in the section below on Task 2.

**Task 2: Technical Services**

**Task Objective:** Provide technical services associated to PFS States by completing various agency-specific and cross-agency activities identified in the work plan.

**Activities**:

1. **Connecticut** 
   * Task 2.CT.1: Updated and sent FME workspace to CT and requested new/updated data for testing FME workspace that was developed for data QA/QC.
   * Task 2.CT.2: Defined new task that would involve providing information on design-GIS data exchange using IFC. Conducted work sessions to share information about the BIM processes, tools and technologies associated with migrating design data to GIS-based asset management systems. Provided access to data governance portal for accessing BIM Asset Information Requirements (AIRs) and Data Catalog being developed as part of AEGIST.
2. **Idaho**
   * Task 2.ID.1: Developed plan of technical services for Base Period (fiscal year 2023) and Performance Period (fiscal year 2024).
   * Task 2.ID.2: Developed draft roadmap for road network data governance implementation based on the data governance framework developed in fiscal year 2021. Developed approach for governance of road centerline, routes and road segments data.
   * Task 2.ID.3: Validated approach for conflating federal lands and ITD LRS roads based on pilot testing of conflation tools and techniques.
3. **Tennessee**
   * Task 2.TN.2:Executed following activities as part of Design-GIS data exchange pilot
     + Acquired design files from TDOT and prepared design test file for piloting data migration from design drawing to GIS-based linear referencing system.
     + Reviewed Bentley ORD workspace configuration and developed recommendations for how the configuration should be updated to meet asset information requirements (that were developed based on inputs from TDOT on data needs in LRS system).
4. **California**
   * Task 2.CA.1: Continued development of data and application architecture document. Following sections of the document were updated:
     + Chapter 1: Reviewed and edited CaRS project scope. Share updated scope with Caltrans for inputs and feedback.
     + Chapter 2: CARS Charter: Setup discussion between Caltrans and Merced to discuss roles, responsibilities of personnel in All Roads Working Group (ARWG)
     + Chapter 4: Add data quality assessment results from 1Integrate. Review 1Integrate data assessment results to determine how Caltrans and Merced roads data will be conflated
     + Chapter 5: Application architecture section, wherein information about ArcGIS Online
   * Developed updated CaRS Flyer, CaRS Report, and prepared presentation to the California State Geospatial Information Officer.
   * Discussed CaRS Data Architecture Pilots with 1Spatial, Caltrans, CalOES, and Merced County. Provided data and one drive folder access to 1Spatial to share all data and documents.
5. **Pennsylvania**
   * Task 2.PA.1: Technical Services Planning – Scope was updated as follows:

**Scope of the following tasks was reviewed and updated for AEGIST support and technical services.**

* Task 2.PA.1: Technical Services Planning
* Task 2.PA.2: Local Traffic Count Site Selection Algorithm Review
* Task 2.PA.6: BIM-GIS Data Exchange Pilot to support PennDOT Digital Delivery Plan
* Task 2.PA.7: Speed Limit Data Modeling & Quality using Routes, Signs, Curves Data & Spatial Rules
* Task 2.PA.10: NG-911/e911, RMS and National Road Network (NRN) Data Modeling Alignment
* Task 2.PA.11: LRS Systems Demonstration to support RMS Rewrite
* Task 2.PA.12: LRS Capability/Administration Levels Model
* Task 2.PA.14: Data Governance for Building Information Modeling (Better Information Management)
* Task 2.PA.15: Pavement Construction History

**Following tasks were not incorporated in the work plan due to scope and budget constraints.**

* Task 2.PA.4: Horizontal and Vertical Curves Data Engineering from LRS Routes: Geoprocessing Tool
* Task 2.PA.5: Geocoding process automation
* Task 2.PA.8: Review MIRE Data Assessment Scores and Develop Data Model Improvement Tool
* Task 2.PA.13: Right-of-Way Object-Based BIM Data Modeling – Best Practices and Pilot

**Following tasks were taken out from AEGIST technical services scope**

* Task 2.PA.3: Statewide Safety Data, Extraction, Integration, Engineering and Publication by County
* Task 2.PA.9: Best Practices for Data Schema Change Migration to Minimize Downtime
  + Task 2.PA.7: Speed Limit Data Modeling & Quality using Routes, Signs, Curves Data & Spatial Rules – Updated python scripts to extract speed data from PDF and excel documents. Tested the spatial data file that was created and developed data quality assessment rules.
  + Task 2.PA.10: NG-911/e911, RMS and National Road Network (NRN) Data Modeling Alignment
    - Conducted comparative analysis of roads data modeling rules used in PEMA NG911
    - Prepared and shared draft slide-deck with all presenters and collaborators at PennDOT, PEMA, FHWA for gathering inputs and preparing the final presentation deck for delivery at NG911 GIS Conference Presentation on June 15th
    - Delivered presentation on NG911 and Roads Data Integration at PA GIS Conference on June 15th.
  + Task 2.PA.12: LRS Capability/Administration Levels Model - Updated the LRS administration levels document taking into consideration PennDOT road network data modeling practice and rules.

1. **Ohio**
   * Developed executive summary of Ohio Strategic Roadmap which included:
     + Identifying the goals and vision that need to be accomplished with the activities in the roadmap
     + Identifying the business use cases that would need to be addressed with the activities in the roadmap
     + Developing the framework for establishing roles and responsibilities associated with implementing each of the roadmap activities.
     + Tracking the progress of each roadmap activity, routinely, using Agile management approach
   * Specific sub-activities that were done to advance development of roadmap are listed below:
     + 2.OH.1.7: Data Quality Framework Development – Continued to review the Ohio data quality rules in the FME workspace and compared the rules identified in the AEGIST catalog to identify any gaps.
     + 2.OH.1.4: Roadway Inventory: Bike lanes, Turn lanes, Conflation of Assets to LRS/GIS: Review of
       - Reviewed Montgomery County data schema and data modeling approach.
       - Reviewed requirements in the USDOT Equity Action Plan for developing Bike and Pedestrian GIS network.
2. **Washington**
   * Task 2.WS.1: Technical Services work planning

This task involved identifying technical services activities and developing scope of work for them. Following tasks were discussed with Washington State and submitted for inputs and feedback on detailed scope.

* + - Task 2.WS.2: Building All Roads LRS – State and County Roads
    - Task 2.WS.3: All/State Roads Data Modeling in LRS Systems: Frontage Roads, Ramps, Local Crossings, Roundabouts (LRS DB Modernization)
    - Task 2.WS.4: Best Practices for Managing Road Geometry in the LRS: All/State Roads
    - Task 2.WS.5: Roads Inventory data modeling (e.g.: speed limit) & data management (DB modernization)
    - Task 2.WS.6: Provisioning Roads data to Stakeholders (e.g.: Projects, Safety, Asset Management, etc.)
    - Task 2.WS.7: Intersection Modeling

Held biweekly meetings with stakeholders at Washington DOT to identify scope of these tasks, understand existing Washington State systems and data. Discussed Washington State processes, data and business rules shared by Washington and take this information into consideration when developing scope for AEGIST technical services activities.

1. **North Carolina**
   * Task 2.NC.1: Intersection Modeling - Updated Intersection data modeling geoprocessing tool. Added following features:
     + MIRE data schema attributes
     + MIRE coded value domains
     + Intersection geometry generation rules
     + Held meeting with NCDOT and VHB to discuss intersection data modeling rules for intersection leg geometry and intersection data schema attributes

Python scripts were developed in a manner such that the scripts and rules can be used for intersection data modeling work at Kansas, Florida and New Mexico.

1. **Kansas**
   * Task 2.KS.1: Intersection Modeling
     + Tested new version of intersection modeling scripts that were developed with NCDOT data. The scripts were tested with Kansas data.
     + Merged intersection data from Safety Business Unit excel sheets with Intersection Manager feature layers.
   * Task 2.KS.3: Intersection AADT Model development. This task was initially added as a new task but was updated during this quarter to be part of the intersection modeling task 2.KS.1. Going forward it will be tracked under task 2.KS.1. Following activities were performed for Intersection Leg AADT modeling:
     + Processed Kansas LRS event layers associated with “Traffic Sequence”, “AADT”, “LRS Routes”, and Intersection Manager features to generate Intersection Leg data model with AADT information.
     + Delivered Intersection AADT feature class to Kansas.

**Task 3: Marketing and Communication**

**Task Objective:** Webinars and Workshops will be held, and Articles will be presented in conferences and other industry forums to communicate information about the activities of the project, especially the technical work products developed as part of the project.

**Activities**:

1. **Task 3.1.x – AEGIST Articles**
   * **Task 3.1.5 - Article 5:** Developed **“***LRS Administration Levels and Maturity Model”* for following activities:
     + Activity 2.1: LRS Route Naming and Identification
     + Activity 2.2: LRS Route Concurrency
     + Activity 2.3: LRS Centerline Modeling Detail (LOD)
     + Activity 2.4: LRS Centerline Accuracy (2D) (LOA)
     + Activity 2.5: LRS Centerline Authoritative Source
     + Activity 2.6: Mileage Accumulation Direction
     + Activity 2.7: Divided-Undivided Highways Modeling
     + Activity 2.8: Linear Referencing Methods (LRM) Maintenance
2. **Task 3.2.x – AEGIST Workshops & Presentations**
   * **Task 3.2.3:** Conducted GIS-T Workshop on April 19th, 2022.
   * **Task 3.2.4:** Prepared and delivered following presentations;
     + Spatial Data Governance: Presentation to and discussion with following PFS States North Carolina, Pennsylvania, Idaho and Tennessee (April 11th)
     + Prepared and delivered presentation on AEGIST activities and updates at the RDIP Conference in Rhode Island (April. 2022).
     + Prepared presentation on AEGIST activities and updates for the RDIP Conference in West Virginia (June 2022). However, this presentation was not delivered in person or virtually due to conflict with NaTMEC and PA GIS Conference. The presentation was posted on the AEGIST website.
     + Prepared and delivered AEGIST presentation at NaTMEC 2022 in June, 2022. Presentation Title: Integrating Roads and Intersection data from multiple sources for traffic and safety data referencing, data analysis and development of topologically connected routable network.
     + Prepared and delivered AEGIST presentation at CTPP Conference in June, 2022. Presentation Title: Geospatial Data Engineering and Data Science for Transportation Planning.

Posted all workshop and presentation material on AEGIST website: <https://gisintransportation.com/presentations/>

**Task 4: Peer Exchange Meetings**

**Task Objective:** Plan, organize and conduct 5 peer exchanges, one each year between 2019 and 2023.

**Work Accomplished**: Following activities were performed in the reporting period:

Work Planned for Next Reporting Period: July – Sept 2022

**Task 1: Project Management**

**Task Objective**: Perform project management activities, which include conducting monthly status meetings, developing quarterly status reports, creating project work plan, managing project resources, schedule, deliverables and communication with all stakeholders.

**Activities**:

1. Prepare and deliver quarterly report #11 for the period April –June, 2022.
2. Prepare and deliver invoices for the year 2022.
3. Conduct backlog grooming, sprint planning and end-of-sprint meetings with following PFS States: Idaho, California, Pennsylvania, Ohio, Kansas, North Carolina, Florida, Washington and Massachusetts.
4. Update AEGIST Outreach website <https://gisintransportation.com/> by publishing information about AEGIST events and presentations.

**Task 2: Technical Services**

**Task Objective:** Provide technical services associated to PFS States by completing various agency-specific and cross-agency activities identified in the work plan.

**Activities**:

1. **Idaho**
   * Prepare agenda for presentation of AEGIST activities update at the ITD Data Summit in October (26-29)
   * Deliver AEGIST documents and deliverables for the October ITD Data Summit
   * Provide Status update and executive summary on AEGIST Idaho activities in (a) Base/Original Performance Period and (b) Performance Period 1.
   * Present data quality rules created for HPMS data and development of data quality dashboards
   * Deliver roadmap of road network data modeling, data engineering and governance activities and specifically discuss following activities in the roadmap
     + BIM-GIS Integration for delivering road realignment and roadway characteristics data to GIS
     + Incorporating data quality rules catalog in the data governance framework
     + NG911 and FLMA Roads data integration with DOT Roads
     + Local Roads data integration with DOT Roads and development of Data Supply Chain Framework
2. **Tennessee**
   * Task 2.TN.2:Execute following activities as part of Design-GIS data exchange pilot
     + Initiate pilot to import data from design files into Roads and Highways LRS
     + Coordinate with Bentley and Esri to review software features available for design to LRS data migration.
3. **California**
   * Communicate next steps to stakeholders on work products and deliverables being produced for CaRS
   * Coordinate with 1Spatial on conflating Merced roads and Caltrans All Roads using 1Integrate
   * Review road geometry and attribute conflation results between Caltrans All Roads and Merced County Roads datasets with Stakeholders.
   * Discussion on Caltrans 1Integrate Platform: Rules Configured and Results from execution of data quality rule checks on Merced County data.
4. **Pennsylvania**
   * Task 2.PA.1: Discuss completed technical work activities and progress on ongoing work activities. Review potential for discussion on additional funding for some technical work activities
   * Task 2.PA.15: Pavement Construction History – Research pavement construction history practices and compline report to complete task.
   * Task 2.PA.7: Advance geoprocessing tool to extract speed limit data from PDF and excel documents and locate the data spatially
   * Task 2.PA.10: NG-911/e911, RMS and National Road Network (NRN) Data Modeling Alignment – Compile report of findings presented at the PA GIS conference and discuss next steps
   * Task 2.PA.6: BIM-GIS Data Exchange Pilot to support PennDOT Digital Delivery Plan – Identify asset information requirements taking into consideration PennDOT inputs
5. **Ohio**
   * Review Strategic Roadmap recommendations with ODOT and identify the stakeholders at ODOT who would conduct the work required to execute the recommended activities.
   * Based on the approved roadmap activities, identified stakeholders and roadmap validation/update requirements, determine if meetings need to be held with OGRIP, Safety and Travel Demand Modeling groups
   * Update roadmap activity associated with LBRS v2 based on information on ADOTs Data Supply Chain and local-State Roads data integration activities
6. **Washington**
   * Task 2.WS.1: Technical Services work planning: Prepare and deliver scope of work document to Washington DOT by reviewing and combining each of the following five (5) tasks that were identified in this quarter related to:
     + Task 2.WS.2: Building All Roads LRS – State and County Roads
     + Task 2.WS.3: All/State Roads Data Modeling in LRS Systems: Frontage Roads, Ramps, Local Crossings, Roundabouts (LRS DB Modernization)
     + Task 2.WS.4: Best Practices for Managing Road Geometry in the LRS: All/State Roads
     + Task 2.WS.5: Roads Inventory data modeling and data management (DB modernization)
     + Task 2.WS.6: Provisioning Roads data to Stakeholders
     + Task 2.WS.7: Intersection Modeling

As part of the scope of work, identify the practices of peer States that will be reviewed as part of LRS configuration guidance. Establish timeline for conducting the LRS configuration work.

Ensure that following two activities are proposed in pilot scope: (a) LRS Configuration Pilot in Esri Roads & Highways and (b) Intersection Modeling for MIRE 2026

Discuss approach and next steps for review of scope, while factoring in where WSDOT is today (in terms of culture, viewpoints, thoughts and resources) on Enterprise GIS-LRS

1. **North Carolina**
   * Task 2.NC.1: Conduct technical work session with NCDOT GIS, NCDOT Safety and VHB on ongoing Intersection Modeling work as part of AEGIST project with NCDOT GIS and VHB’s Intersection modeling project with NCDOT Safety
2. **Kansas**
   * Integrate Intersection data in the excel spreadsheets that were created by Kansas Safety Unit with the Intersection data in Kansas DOT Roads & Highways ALRS.
   * Discuss Florida’s FLARIS intersection model, and key take-aways for Kansas from the data model.
   * Assist in development of Kansas DOTs presentation for Santa Fe Meeting, including configuration of Intersection Data Model in Roads and Highways
   * Develop data model for KDOT Intersection Legs and incorporate AADT from Traffic feature layers.

**Task 3: Marketing and Communication**

**Task Objective:** Webinars and Workshops will be held, and Articles will be presented in conferences and other industry forums to communicate information about the activities of the project, especially the technical work products developed as part of the project.

**Activities**:

1. **Task 3.1.x – AEGIST Articles:**

Following work will be carried out on the articles during the remaining quarters of 2022.

* + **Task 3.1.5 – Article 4:**
    - At the Santa Fe Peer Exchange meeting, discuss whether PFS States would like to work on establishing process, tools and techniques for integrating local roads and DOT roads datasets. Determine if a scrum team should be formed to discuss this topic. If yes,
      * Request Scrum team meeting with volunteering States and setup discussion on Data Supply Chain for NG911 and DOT Roads Data Integration.
      * Conduct case study on Arizona DOT’s Data Supply Chain, Data Systems and Technology Architecture for integration of DOT and Local Roads Data
    - Review ADOT Paper and Story Board on Data Supply Chain for Integrating State DOT and Local Agency Roads Datasets using the Conflation and Demarcation Points approach
    - Establish next steps and requested meeting to discuss technical architecture and process for integrating State DOT and Local roads datasets
  + **Task 3.1.5 - Article 5:** Update AEGIST Article 5 on **“***LRS Administration Levels and Maturity Model”*. Incorporate key take-aways from the Santa-Fe Peer exchange meeting
    - Multiple business use cases require different levels of information or levels of development in the road network data model
    - Incorporate list of 180+ use cases gathered by NCDOT at the enterprise level.
    - Update road network data model terms and definitions shared by Tom Roff (FHWA) and align the terminology and the data model with HPMS 9.0.

1. **Task 3.2.x – AEGIST Workshops & Presentations**
   * **Task 3.2.4:** Prepare and deliver presentations; or submit presentation abstracts for
     + Prepare IHEEP Presentation in September on BIM-GIS data integration.

**Task 4: Peer Exchange Meetings**

**Task Objective:** Plan, organize and conduct 5 peer exchanges, one each year between 2019 and 2023.

Following activities are to be performed for planning of the Santa-Fe Peer Exchange Meeting:

* + Hold planning meetings with State DOTs and FHWA to finalize agenda, presenters and discussion topics
  + Finalize DOT presentation slides with all presenting States
  + Develop AEGIST Glossary document with FHWA and State DOTs
  + Develop detailed session-by-session agenda for the Santa Fe Meeting.
  + Schedule arrangements with the hotel and transportation logistics
  + Develop instructions for reimbursement filing for State DOTs.

**Complete List of AEGIST Deliverables**

**Note:** Deliverables on which work is complete (in green) and work is in progress (in light yellow).

| Task | D# | Deliverable Name | Due Date | Status |
| --- | --- | --- | --- | --- |
| Task 1\* | 1.1.0 | Kick-off Meeting | 10/30/19 | Completed. |
| Task 1\* | 1.2.0 | Work Plan Version 1: Cross-Agency Tasks, Deliverables & Schedule | 4/30/20 | Completed. Submitted to FHWA and PFS States. |
| Task 1\* | 1.3.1 | Quarterly Progress Report - 1 (incl. 3 monthly reports and quarterly meetings) | 12/31/19 | Completed. Submitted to FHWA. Email sent to PFS States. |
| Task 1\* | 1.3.2 | Quarterly Progress Report - 2 (incl. 3 monthly reports and quarterly meetings) | 3/31/20 | Completed. Submitted to FHWA.  Email sent to PFS States. |
| Task 1\* | 1.3.3 | Quarterly Progress Report - 3 (incl. 3 monthly reports and quarterly meetings) | 6/30/20 | MPR for April, May, June published.  QPR-3 (April-June) published. |
| Task 1\* | 1.3.4 | Quarterly Progress Report - 4 (incl. 3 monthly reports and quarterly meetings) | 9/30/20 | MPR for July and August prepared. QPR-4 Prepared. |
| Task 1\* | 1.3.5 | Quarterly Progress Report - 5 (incl. quarterly meetings) | 12/31/20 | QPR-5 report prepared. QTR meeting held in Dec 2020 |
| Task 1\* | 1.3.6 | Quarterly Progress Report - 6: Jan-Apr 2021 (incl. quarterly meet) | 4/31/21 | QPR-6 prepared. QTR Meeting (Mar 2021) |
| Task 1\* | 1.3.7 | Quarterly Progress Report - 7: May-July 2021 (incl. quarterly meet) | 7/30/21 | QPR-7 Completed and Submitted.  Quarterly meeting held. |
| Task 1\*\* | 1.3.8 | Quarterly Progress Report - 8: Aug-Sept 2021 (incl. quarterly meet) | 9/30/21 | QPR-8 Completed and Submitted.  Quarterly meeting held. |
| Task 1\*\* | 1.3.9 | Quarterly Progress Report - 9: Oct-Dec 2021 (incl. quarterly meet) | 12/30/21 | QPR-9 Completed and Submitted.  Quarterly meeting held. |
| Task 1\*\* | 1.3.10 | Quarterly Progress Report - 10: Jan-Mar 2022 (incl. quarterly meet) | 3/31/22 | QPR-10 Completed and Submitted.  Quarterly meeting held. |
| Task 1\*\* | 1.3.11 | Quarterly Progress Report - 11: Apr-Jun 2022 (incl. quarterly meet) | 6/30/22 | QPR-11 Completed and Submitted.  Quarterly meeting to be held in July 2022. |
| Task 2\* | 2.1 | TASK 2 Technical Services (incl. Work Plan v1.1 with State Tasks) - MONTH 8 - MAY 2020 | 5/30/20 | Work Plan v1.1 has Caltrans Tasks.  May 29th PFS States Presentation. |
| Task 2\* | 2.2 | TASK 2 Technical Services (incl. Work Plan v1.2 with State Tasks) - MONTH 9 - JUN 2020 | 6/30/20 | Work Plan v1.2 has CA, GA, ID Tasks.  June 16th PFS States Presentation. |
| Task 2\* | 2.3 | TASK 2 Base Period Technical Services (incl. Work Plan v1.3 with State Tasks) - MONTH 10 - JUL 2020 | 7/30/20 | Work Plan v1.3 with ID Task updates. Weekly work planning with Idaho. |
| Task 2\* | 2.4 | TASK 2 Technical Services (incl. Work Plan v1.4 with State Tasks) - MONTH 11 - AUG 2020 | 8/30/20 | Work Plan v1.4. Tasks 2.1, 2.2, 2.ID.1 |
| Task 2\* | 2.5 | TASK 2 Technical Services (incl. Work Plan v1.5 with State Tasks) - MONTH 12 - SEP 2020 | 9/30/20 | Work Plan v1.5 with ID Task updates.  Tasks 2.1, 2.2, 2.ID.2 and 2.ID.3 |
| Task 2\* | 2.6 | TASK 2 Technical Services - MONTH 13 - OCT 2020 | 10/30/20 | Work plan activities at ID, TN, CA and Tasks 2.1 and 2.2. |
| Task 2\* | 2.7 | TASK 2 Technical Services - MONTH 14 - NOV 2020 | 11/30/20 | Work plan activities at ID, TN, CA and Tasks 2.1 and 2.2. |
| Task 2\* | 2.8 | TASK 2 Technical Services (incl. Work Plan v1.6 with State Tasks) - MONTH 15 - DEC 2020 | 12/30/20 | Work Plan v1.6 with updates for ID, CT, TN and CA. Continued Tasks 2.1 and 2.2 |
| Task 2\* | 2.9 | TASK 2 Technical Services - MONTH 16 - JAN 2021 | 1/20/21 | Technical Services to ID, TN, CA, PA, CT, OH and Cross-agency Tasks 2.1 & 2.2. |
| Task 2\* | 2.10 | TASK 2 Technical Services - MONTH 17 - FEB 2021 | 2/28/21 | Technical Services to ID, TN, CA, PA, CT, OH and Cross-agency Tasks 2.1 & 2.2. |
| Task 2\* | 2.11 | TASK 2 Technical Services - MONTH 18 - MAR 2021 | 3/20/21 | Technical Services to ID, TN, CA, PA, CT, OH and Cross-agency Tasks 2.1 & 2.2. |
| Task 2\* | 2.12 | TASK 2 Technical Services - MONTH 19 - APR 2021 | 4/30/21 | Technical Services to ID, TN, CA, PA, CT, OH and Cross-agency Tasks 2.1 & 2.2. |
| Task 2\* | 2.13 | TASK 2 Technical Services - MONTH 20 - MAY 2021 | 5/30/21 | Technical services to PFS States and for Cross-agency Tasks 2.1 & 2.2. |
| Task 2\* | 2.14 | TASK 2 Technical Services - MONTH 21 - JUN 2021 | 6/30/21 | Technical services to PFS States and for Cross-agency Tasks 2.1 & 2.2. |
| Task 2\* | 2.15 | TASK 2 Technical Services - MONTH 22 - JUL 2021 | 7/30/21 | Technical services to PFS States and for Cross-agency Tasks 2.1 & 2.2. |
| Task 2\* | 2.16.1 | TASK 2 Technical Services - MONTH 23 - AUG 2021 | 8/30/21 | Technical Services to 8 States as listed in the quarterly report. |
| Task 2\*\* | 2.16.2 | TASK 2 Technical Services - MONTH 23 - AUG 2021 | 8/30/21 | Technical Services to NC and KS, with FL, NM requirements considered as well. |
| Task 2\* | 2.17.1 | TASK 2 Technical Services - MONTH 24 - SEP 2021 | 9/30/21 | Technical Services to 6 Base Period States as listed in the quarterly report. |
| Task 2\*\* | 2.17.2 | TASK 2 Technical Services - MONTH 24 - SEP 2021 | 9/30/21 | Technical Services to NC and KS, with FL, NM requirements considered as well. |
| Task 2\* | 2.18.1 | TASK 2 Technical Services - MONTH 25 - OCT 2021 | 10/30/21 | Technical Services to ID, PA, CA and OH. |
| Task 2\*\* | 2.18.2 | TASK 2 Technical Services - MONTH 25 - OCT 2021 | 10/30/21 | Technical Services to NC and KS, with FL, NM requirements considered as well. |
| Task 2\* | 2.19.1 | TASK 2 Technical Services - MONTH 26 - NOV 2021 | 11/30/21 | Technical Services to ID, PA, CA, NC, KS and OH, as summarized in this report. |
| Task 2\*\* | 2.19.2 | TASK 2 Technical Services - MONTH 26 - NOV 2021 | 11/30/21 | Technical Services to NC and KS, with FL, NM requirements considered as well. |
| Task 2\* | 2.20.1 | TASK 2 Technical Services - MONTH 27 - DEC2021 | 12/30/21 | Technical Services to ID, PA, CA, NC, KS and OH, as summarized in this report. |
| Task 2\*\* | 2.20.2 | TASK 2 Technical Services - MONTH 27 - DEC2021 | 12/30/21 | Technical Services to NC and KS, with FL, NM requirements considered as well. |
| Task 2 | 2.21.1 | TASK 2 Technical Services - MONTH 28 - JAN2022 | 1/30/22 | Technical Services to PFS States in Base Period as listed in QTR Report #10. |
| Task 2\*\* | 2.21.2 | TASK 2 Technical Services - MONTH 28 - JAN2022 | 1/30/22 | Technical Services to NC and KS, with FL, NM requirements considered as well. |
| Task 2 | 2.22.1 | TASK 2 Technical Services - MONTH 29 - FEB2022 | 2/30/22 | Technical Services to PFS States in Base Period as listed in QTR Report #10. |
| Task 2\*\* | 2.22.2 | TASK 2 Technical Services - MONTH 29 - FEB2022 | 2/30/22 | Technical Services to NC and KS, with FL, NM requirements considered as well. |
| Task 2 | 2.23.1 | TASK 2 Technical Services - MONTH 30 - MAR 2022 | 3/30/22 | Technical Services to PFS States in Base Period as listed in QTR Report #10. |
| Task 2\*\* | 2.23.2 | TASK 2 Technical Services - MONTH 30 - MAR 2022 | 3/30/22 | Technical Services to NC and KS, with FL, NM requirements considered as well. |
| Task 2 | 2.24.1 | TASK 2 Technical Services - MONTH 31 - APR 2022 | 4/30/22 | Technical Services to PFS States in Base Period as listed in QTR Report #11. |
| Task 2\*\* | 2.24.2 | TASK 2 Technical Services - MONTH 31 - APR 2022 | 4/30/22 | Technical Services to NC and KS, with FL, NM requirements considered as well. |
| Task 2 | 2.25.1 | TASK 2 Technical Services - MONTH 32 - MAY 2022 | 5/30/22 | Technical Services to PFS States in Base Period as listed in QTR Report #11. |
| Task 2\*\* | 2.25.2 | TASK 2 Technical Services - MONTH 32 - MAY 2022 | 5/30/22 | Technical Services to NC and KS, with FL, NM requirements considered as well. |
| Task 2 | 2.26.1 | TASK 2 Technical Services - MONTH 33 - JUN 2022 | 6/30/22 | Not Started |
| Task 2\*\* | 2.26.2 | TASK 2 Technical Services - MONTH 33 - JUN 2022 | 6/30/22 |  |
| Task 2 | 2.27.1 | TASK 2 Technical Services - MONTH 34 – JUL 2022 | 7/30/22 | Not Started |
| Task 2\*\* | 2.27.2 | TASK 2 Technical Services - MONTH 34 – JUL 2022 | 7/30/22 | Not Started |
| Task 2 | 2.28 | TASK 2 Technical Services - MONTH 35 – AUG 2022 | 8/30/22 | Not Started |
| Task 2\*\* | 2.28 | TASK 2 Technical Services - MONTH 35 – AUG 2022 | 8/30/22 | Not Started |
| Task 2 | 2.29 | TASK 2 Technical Services - MONTH 36 - SEPT 2022 | 9/30/22 | Not Started |
| Task 2\*\* | 2.29 | TASK 2 Technical Services - MONTH 36 - SEPT 2022 | 9/30/22 | Not Started |
| Task 2 | 2.30 | TASK 2 Technical Services - MONTH 37 - OCT 2022 | 10/30/22 | Not Started |
| Task 2\*\* | 2.30 | TASK 2 Technical Services - MONTH 37 - OCT 2022 | 10/30/22 | Not Started |
| Task 2 | 2.31 | TASK 2 Technical Services - MONTH 38 - NOV 2022 | 11/30/22 | Not Started |
| Task 2\*\* | 2.31 | TASK 2 Technical Services - MONTH 38 - NOV 2022 | 11/30/22 | Not Started |
| Task 2 | 2.32 | TASK 2 Technical Services - MONTH 39 - DEC 2022 | 12/30/22 | Not Started |
| Task 2\*\* | 2.32 | TASK 2 Technical Services - MONTH 39 - DEC 2022 | 12/30/22 | Not Started |
| Task 2 | 2.33 | TASK 2 Technical Services - MONTH 40 - JAN 2023 | 1/30/23 | Not Started |
| Task 2\*\* | 2.33 | TASK 2 Technical Services - MONTH 40 - JAN 2023 | 1/30/23 | Not Started |
| Task 2 | 2.34 | TASK 2 Technical Services - MONTH 41 - FEB 2023 | 2/30/23 | Not Started |
| Task 2\*\* | 2.34 | TASK 2 Technical Services - MONTH 41 - FEB 2023 | 2/30/23 | Not Started |
| Task 2 | 2.35 | TASK 2 Technical Services - MONTH 42 - MAR 2023 | 3/30/23 | Not Started |
| Task 2\*\* | 2.35 | TASK 2 Technical Services - MONTH 42 - MAR 2023 | 3/30/23 | Not Started |
| Task 2 | 2.36 | TASK 2 Technical Services - MONTH 43 - APR 2023 | 4/30/23 | Not Started |
| Task 2\*\* | 2.36 | TASK 2 Technical Services - MONTH 43 - APR 2023 | 4/30/23 | Not Started |
| Task 2 | 2.37 | TASK 2 Technical Services - MONTH 44 - MAY 2023 | 5/30/23 | Not Started |
| Task 2\*\* | 2.37 | TASK 2 Technical Services - MONTH 44 - MAY 2023 | 5/30/23 | Not Started |
| Task 3\*\* | 3.1.1 | **Article 1**: Road Network Publication Data Model with Topology, Temporality, Routable Network Rule | 5/30/21 | In-Progress |
| Task 3\*\* | 3.1.2 | **Article 2:** Enterprise GIS Application for Spatial Safety Performance Functions Calibration and HSM-based Safety Analysis | 5/30/22 | In-Progress |
| Task 3\*\* | 3.1.3 | **Article 3:** Engineering, processing and integrating spatial Traffic and Safety Data using Cloud | 12/30/22 | In-Progress |
| Task 3\*\* | 3.1.4 | **Article 4:** Enterprise GIS Application forModeling and Conflating Federal Lands Management Agency, DOT LRS and Local Agency Roads data | 12/30/23 | In-Progress |
| Task 3\*\* | 3.1.5 | **Article 5:** LRS Administration Levels and Maturity Mode | 9/30/24 | In-Progress |
| Task 3 | 3.2.1 | Workshop 1 - GIS-T 2021 | 4/30/21 | GIS-T Workshop 2021 Delivered |
| Task 3\* | 3.2.2 | AEGIST Presentations (2020) | 12/30/20 | **Following Presentations Delivered:**  NY (Apr); TRF (Aug); KS (Jun); National Roads Symposium (Sep); Esri RHUG (Oct), AEGIST Modeling & Standards (Dec). |
| Task 3\*\* | 3.2.3 | Workshop 2 – GIS-T 2022 | 5/30/22 | Delivered Workshop in April 2022. |
| Task 3\* | 3.2.4 | AEGIST Presentations (2021) | 12/30/21 | Completed delivery of following 2021 Presentations:   1. USDOT Presentation on April 2nd. 2. Presentations to new PFS States: WV, DC 3. Provided AEGIST Overview to Colorado.Presentation at NaTMEC on Jun 23rd. FHWA NRN Presentation on Aug 31st. 4. Presentation Slides for FHWA Safety Group on AEGIST-MIRE activities. 5. FLMA Presentation on Nov 9th. |
| Task 3\*\* | 3.2.5 | AEGIST Presentations (2022) | 12/30/22 | Following presentations have been delivered in 2022, as of this quarter:   1. TRB AEGIST Update at AED40 Committee Meetings 2. USDOT Mobility Plan Business Group Update (Feb 1st) 3. AASHTO GIS-T Conference – AEGIST Updates (April 21st) 4. Presentation for Gloria Shepherd 5. Spatial Data Governance presentation to NC, TN, ID, PA (April 1st, 2022) 6. RDIP Conference in Rhode Island (April. 2022) 7. NaTMEC 2022 in June, 2022 8. CTPP Conference in June, 2022 9. RDIP Conference in West Virginia (June 2022) 10. IHEEP Conference Presentation Preparation (Sept 2022) |
| Task 3\*\* | 3.2.6 | AEGIST Presentations (2023) | 12/30/2023 | Not Started |
| Task 3\*\* | 3.2.7 | Workshop 3 - GIS-T 2023 | 4/30/2023 | Not Started |
| Task 3\*\* | 3.2.8 | AEGIST Presentations (2024) | 5/30/2024 | Not Started |
| Task 3\*\* | 3.2.9 | Workshop 4 - GIS-T 2024 | 4/30/2024 | Not Started |
| Task 3 | 3.3.1 | Webinar 1: Data Governance | 2/11/21 | Webinar delivered on Feb 11th, 2021 |
| Task 3 | 3.3.2 | Webinar 2: AEGIST Activities associated with Spatial Data Modeling, Integration and Analysis | TBD | TBD |
| Task 4 | 4.1.0 | Peer-Exchange 1 - 2019 | 12/30/19 | Completed. |
| Task 4 | 4.2.0 | Peer-Exchange 2 - 2020 | 12/30/20 | Aug 25th-26th Peer Exchange Conducted. |
| Task 4 | 4.3.0 | Peer-Exchange 3 – 2022 | 08/30/22 | Started Planning for Santa Fe Meeting |
| Task 5 | 5.0 | HPMS 9.0 Remodeling Report/Article Database Design | 5/30/21 | Delivered report on Road Network Publication Data Model for FHWA and PFS States Review completed between July-Sept. Comments Addressed.  Coordinate with FHWA to determine next Steps on publication to be determined. |

\* Tasks in Base/Original Period (CLIN 0001)

\*\*Tasks in Performance Period 1 (CLIN 0002)