# *Quarterly Progress Report (QPR)*

# *Applications of Enterprise GIS in Transportation*

**Progress Report for Quarter [April 1st, 2024 – June 30th, 2024]**

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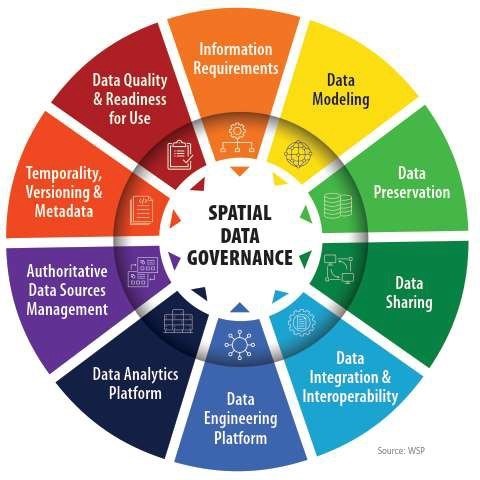
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Description automatically generatedWSP Technical Lead: Abhishek Bhargava (abhishek.bhargava@wsp.com)

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 December 30, 2024

Total Time, months: 63

Time Expended, months: 57

Percent Calendar Time Expended: 90%

Percent Complete for Tasks & Sub-Tasks:

|  |  |  |  |
| --- | --- | --- | --- |
| **Base Period: CLIN0001** | | | |
| **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.   Washington **- 100%** | | **100%** |
| 2.   Georgia **- 100%** | |
| 3.   Idaho - **100%** | |
| 4. California - **100%** | |
| 5. Pennsylvania **- 100%** | |
| 6. Ohio - **100%** | |
| Cross-Agency Activities: Guidebook Development - **100%** | |
| 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%** |
| **HPMS 9.0 Data Architecture: CLIN0005** | | | |
| **Tasks** | **Sub-Tasks** | **Percent-Complete** | |
| Task 5: HPMS 9.0 Recommendations | Road Network Data Architecture  Data Modeling Standards, Use Cases, Topology | **100%** | |
| **Performance Period 1 and 2: CLIN0002 and CLIN0003** | | | |
| **Tasks** | **Sub-Tasks** | | **Percent Complete** |
| Task 1: Project Management | 1.  Quarterly Meetings & Technical Tasks Planning | | **60%** |
| 2.  Quarterly Status Reports | |
| Task 2: Technical Services | 1.   New Mexico – **10%** | | **40%** |
| 2.   Connecticut – **60%** | |
| 3.   Florida – **10%** | |
| 4. North Carolina **– 15%** | |
| 5. Kansas **– 10%** | |
| 6. Tennessee **– 65%** | |
| 7. Massachusetts **– 7%** | |
| 8. North Dakota – **5%** | |
| 9. Arizona – **5%** | |
| 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 | | **100%** |
| Task 4: Member State Meetings | 1.  Member State Meeting 1 – 2022  2. Member State Meeting 2 – 2023 | | **100%** |

Work Accomplished This Reporting Period: April – June 2024

**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 #19 for the period April– June 2024.
2. Technical services tasks managed for following PFS States: Arizona California, Connecticut, Kansas, North Carolina North Dakota, and Massachusetts. 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**:

* **Arizona**

**[Task 2.AZ.1 Route ID Data Architecture]**

* + Investigated options for Route Identification field data architecture by analyzing practices of various business users in Arizona – Planning, Safety, Asset management. Investigated how these business users reference data using routes.
  + Developed kickoff meeting slide-deck in coordination with AZ core team. Included information regarding route identification data architecture, business user practices, project work plan, activities, presenters, and key messages.
  + Developed Google forms poll utilized for gathering starting point information from business group stakeholders at kick-off meeting.
  + Held route ID kick off meeting with ADOT core team, business stakeholders, and FHWA Office of Planning and Safety.
  + Analyzed responses received from ADOT stakeholders on their experience with the current Route ID
  + Developed meeting agendas for follow up discussions based off responses and pain points uncovered at kick off call
  + Conducted ADOT business stakeholder meetings with the following groups:
    - Information Technology – Investigated the ADOT geocoder developed by ITG
    - Systems Management –
    - Maintenance – Investigated ADOT’s Feature Inventory System to determined the features being tracked and how they are referenced in relation to the LRS. Attributes related to the assets tracked in the Feature Inventory System were discussed to determine their relationship with the Intelligent Route ID.
    - Pavement Management- Investigated ADOT’s Project Information Retrieval Tool (PIRT), Pavement Management Database, and dTIMS.
    - Project Management – Investigated the eSTIP dashboard, PeCoS, Project Tracker, DICE, Workfront, and PIRT.
    - Roads Data Management and Federal Reporting - Discussed the possibility of replacing current nomenclature with a route name event table and evaluate other DOTs that are using this approach. Discussed multi-use paths, such as bike and pedestrian paths, and how they relate to the current LRS.
    - Safety Management – Investigated ACIS, CRIS, and ALISS tools to determine how crash data is located on the roadway.
    - Travel Demand Modeling - to review fields and parameters utilized by ADOT’s travel demand model. Investigated the roadway geometry in TransCAD as it relates to HOV lanes and ramps.
    - Digital Delivery - what information is needed from the design/construction data modelers on road network design drawings/models creation. Established agenda and topics for discussion with digital delivery group so that their inputs can be factored in the Route ID data architecture development
    - Crash Records Management - Investigated crash records data management processes and tools that are used to linearly reference crashes on the road network. Established route id architecture requirements for safety analysis and crash records data management.
    - Traffic Monitoring – Investigated how traffic counts data is linearly referenced on road network in the MS2 application. Identified the road data fields in the MS2 application and investigated how the road network information is made available in MS2 for linear referencing of traffic data.
  + Developed agendas for follow up meeting with Travel Demand Modeling group to continue exploring long/short distance models, coding of restrictions and ADOT’s transit network
  + Developed agendas for follow up meeting with Traffic Management group to continue exploring turn movements, intersection traffic data, management lanes information tracked, and necessary manipulation of traffic data for integration into the LRS system.
* **California**

**[Task 2.CA.1] California Roads Sharing (CaRS) report**

* + Held 3 monthly California Roads Sharing Task Force meetings with participating local counties, Caltrans, CCISDA, and CalOES.
  + Analyzed the road network data of the local agencies that was made available by California Office of Emergency Services (CalOES) for use in California Road Sharing (CaRS) Phase 4.
  + Provided a high level presentation on CaRS program goals, data sharing vision, role of local agencies, and public private partnerships to CCISDA Working Group alongside Caltrans, Shasta County, Merced County and CalOES. A Mentimeter poll for tracking interest from CCISDA Working Group local agency participants for future follow-up was utilized during the meeting.
  + Compiled list of counties identified and those that have volunteered to be a part of the CaRS WG through CGIA and CCSIDA Mentimeter polls.
  + Held the first CaRS Task Force meeting under the CCCISDA working group with interested counties
  + Established a CaRS Task Force Teams Channel
  + Held call with Caltrans to discuss 1Integrate tool set up and use, and review data quality rules
  + Coordinated with Caltrans to establish the requirements and setup for 1Data Gateway, ArcGIS hub and 1Integrate platforms so that the county roads data files can be brought in and loaded onto these platforms for integration with Caltrans Roads data
  + Developed presentation for the counties in California to establish the vision, mission, objectives and roles and responsibilities of the California Road Sharing (CaRS) Task Force
  + Held discussions with CCISDA to discuss the structure and process for establishing the CaRS Task Force under CCISDA working group
  + Conducted weekly CaRS progress meeting with Caltrans, CISSDA, CalOES, and Merced County to discuss progress on ArcGIS HUB, Caltrans access for local agency participants, formalization under CISSDA, and agenda for next CaRS Task Force meeting.
  + Architected design of ArcGIS Hub site for the California Road Sharing initiative. Established how ArcGIS hub will be used to host the CaRS “Initiative”, and how Teams, Events, Pages and Community Organization will be setup to enable collaboration between counties, CalOES and Caltrans
  + Split current weekly CaRS progress meetings into two separate biweekly meetings for 1. CaRS Task Force Core Group and 2. CaRS – 1 Spatial.
  + Provided published CaRS materials to CISSDA point of contact for distribution at next monthly CISDDA board meeting.
  + Coordinated with 1Spatial to discuss project activities and develop activity implementation schedule
  + Discussed configuration of roads data quality assessment rules in 1Integrate System with Caltrans and 1Spatial
* **Connecticut**
  + Established the technical architecture for development of the web application for local agencies to request functional class updates
  + Held meeting with Connecticut DOT to identify the servers on which the web application will be hosted, the feature services that will be used by the web application to request functional class updates, and, the workflow that will be followed by user to process the updates.
* **Florida**
  + Presented the intersection modeling geoprocessing tools and intersection data model architecture to Florida DOT
  + Established that the intersection geoprocessing tool needs to be on the latest routes data for generating nodes, intersection points, intersection legs and road elements.
  + Identified the need to use the structures geospatial data to filter out grade-separate nodes and intersection points. Discussed changes that will be made to the geoprocessing tool for identified grade-separated intersections/interchanges.
* **Kansas**

**[Task 2.KS.1] Intersection Data Model**

* + Updated intersection data modeling geoprocessing tool to calculate intersection point geometry from nodes geometry
  + Created geoprocessing tool to automatically generate intersection legs using routes, nodes and road elements information
  + Customized intersection modeling tool to generate intersections from routes
  + Executed intersection modeling tool on Kansas routes data to generate nodes, intersection points, intersection legs
  + Packaged scripts for intersection modeling tool into a model builder tool
  + Updated geoprocessing tool to generate nodes and intersection points to process data in Kansas LRS database
  + Executed intersection modeling tool to generate nodes, intersection points and road elements from Kansas routes data
* **New Mexico**
  + Utilized the AEGIST intersection modeling tool to create Intersection Model for New Mexico using the Routes layer
  + Investigated development of Advanced Linear Referencing System for New Mexico using Esri Roads and Highways. Started migrating New Mexico’s legacy LRS to new ArcGIS Pro 3.2 ALRS
  + Documented development of intersection model for New Mexico using the AEGIST Intersection modeling tool
  + Continued development of the intersection model geoprocessing tool. This tool uses the information on routes and nodes meeting at the intersection to create the intersection model and identify all nodes and routes associated with the intersection
  + Packaged the geoprocessing scripts associated with creating the road elements and nodes into an ArcGIS Pro Notebook
  + Tested intersection geoprocessing tool by investigating various locations in the network
* **North Carolina**

**[Task 2.NC.2] LRS Data Governance]**

* + Developed data quality assessment rules for roadway characteristics from the perspective of following dimensions: Comprehensiveness (Completeness of data), validity of data.
  + Researched data quality administration rules for roadway characteristics associated with traffic by extracting information from the Traffic Monitoring Guide, Highway Performance Monitoring System (HPMS) Manual and Model Inventory of Roadway Elements manual.
  + Developed data quality rules for roadway characteristics such as speed limit, AADT, Single Unit and Combination Unit Traffic, IRI, Rutting, Cracking, Faulting, Pavement Surface, etc. by referring to data requirements and modeling needs of various users in an agency
  + Updated data catalog and use patterns catalog in the governance system and mapped them to each other to allow data governance lead to understand how data assets need to be modeled to address use cases
  + Developed template for capturing systems and applications information in the data governance system using the application communications diagram.
  + Continued clean up of data catalog by extracting Actor information to compare with JobTitle field to accurately capture information.
  + Completed data validation and accompanying graphics for How-To Document of the following:
    - Fields in Business Domain catalog and Data Asset catalog to ensure accurate mapping of which data assets are being supplied, and used by business domains.
    - Fields in Applications Catalog catalog and Data Asset catalog to ensure accurate mapping of which data assets are being created, read, analyzed, updated, delivered, and checked for quality by applications.
    - EPICs and Supports fields of user stories
  + Validation was completed to ensure accurate capture of business domains’ desired data assets.
  + Business domain supplier information was added to the Applications catalog to capture which business domains are responsible for supplying a data asset by way of an application. The process for creating this field was captured in graphics and included in the How To deliverable document.
  + Migrated data from future data asset to data asset in UsePatterns so that all use patterns are mapped to only one data asset field.
  + Continued updating of the UsePatterns section in the How-to-Guide document
  + Continued to build the applications catalog and applications communication diagram to represent the interactions between various data systems and software applications
  + Created script for developing data dictionary automatically using a file geodatabase within the ArcGIS Pro notebook environment.
  + Developed reports/graphs on data dictionary associated with LRS geodatabase
  + Demonstrated how data dictionary can be integrated into the LRS Data governance system
  + Developed data quality rules based on information from MIRE, AASHTO Green Book, Highway Safety Manual and inventoried them into the data catalog
  + Continued to review and update data asset inventory. UsePatterns were mapped to one data asset field only, and status of data asset (current or future) was moved to DataCatalog.
  + Continued to update how to document, including new field names, and adjustments to existing fields/field types (e.g. Properties --> Data Dictionary, etc.)
  + Held discussion with NCDOT on findings and conclusions from the data in the LRS data governance system that was created by AEGIST
  + Developed conclusions on road network data needs, modeling requirements and improvement opportunities for each of the NCDOT business units: planning and programming, operations, transportation mobility and safety, road design unit and multimodal transportation.
  + Started developing flyer to document the AEGIST work done at NCDOT on the data governance system, and how this system can be leveraged to make decisions on road network data modeling
  + Development of How To guide for the data governance system for administrators
  + Development of the data governance executive summary and findings flyer to capture information about key data assets that need to be managed and governed for use by planners, designers, operations and maintenance engineers, traffic and safety engineers
  + Development of geoprocessing tool for creating ALRS data dictionary from LRS geodatabase
  + Drafted flyer for NCDOT providing detailed content analysis of user stories across five business domain groups including Planning and Programming, Photogrammetry, Survey, & Design, Asset Inventory and Maintenance Operations, Traffic Mobility & Safety, and Multi-modal transportation. This was completed by analyzing which data assets and applications were desired for use by each department to support various needs and EPICS.
  + Conducted a meeting with NCDOT to discuss the Roads Data Governance System and the content in it
  + Used the information in the Roads Data Governance system to draw conclusions about the type of road network data modeling projects that need to be taken up for Roads data governance
  + Documented conclusions on the data projects and recommendations drawn from the governance system and established how road network data model should be created for meeting stakeholder requirements.
  + Addressed comments on NCDOT state report on LRS data governance
  + Updated slide-deck on Road Network Data modeling projects and categorized the projects based on the phase/stage/order in which they should be implemented
  + Reviewed and edited documentation on data modeling use cases, data assets and data use patterns
  + Updated final deliverables on LRS data governance summary report and presentation slides to address NCDOT comments and ADA requirements
  + Aligned NCDOT deliverables with the guidelines in AEGIST Guidebook v2 so that it can serve as a reference for the information in the LRS data governance deliverables provided to NCDOT as part of the technical services
  + Delivered the LRS data governance system report summarizing how the system was used to identify data projects
  + Updated final deliverables and summarized the deliverables for NCDOT.
* **North Dakota**

**[Task 2.ND.1] Road Data Extraction from Imagery**

* + Developed tool for accessing the Lidar data on the FTP server and downloading it into an AWS S3 data lake for processing.
  + Developed road polygons for classifying lidar data downloaded from North Dakota FTP server
* **Massachusetts**

**[Task 2.MA.1] Interchange Data Modeling**

* + Developed a tool to create nodes at points where two routes intersect with each other.
  + Developed a draft algorithm to cluster nearby nodes at an intersection so that all nodes in the cluster can be associated with the intersection.
  + Developed a tool for calculating measure values corresponding to all routes that meet at an intersection.
  + Enhanced tool to create following intersection feature elements: Nodes Feature Class, Route Node Measure Table, Intersection/Junction Point, Road Elements
  + Updated algorithm to cluster nearby nodes at an intersection so that all nodes in the cluster can be associated with the intersection.
  + Utilized the AEGIST intersection modeling tool to create Intersection Model for Massachusetts using the Routes layer
  + Utilized Esri “Create Intersection” and “Generate Intersections” geoprocessing tools and coordinate with Esri to report issues experienced with creating intersections
* **Tennessee**
  + Updated the prototype design models to add information about shoulders, sidewalks, median, pavement so that it can be shown how this information can be exported from these models to the GIS-based LRS system
  + Exported geospatial data from design models using the Industry Foundation Classes and geospatial data files and imported data into Tennessee’s LRS system so that it can be used to update LRS features
  + Created tools for calculating road width, lane width, pavement width using the data imported from Design system into GIS-based LRS.
  + Continued with the development of the prototype that can be used demonstrate how BIM data model in design system can be used to extract information about Roadway characteristics such as: Shoulders, Guardrails, Sidewalks, Pavement, Lanes.
  + For exporting information from design system to linear referencing system (LRS), identified the “levels” in the design model from which information about model elements needs to be extracted.
  + Investigated alternative approaches for exporting data from design model. The data exchange workflow investigation involved systems such as Bentley Open Roads Design, BIM Vision, BIM Colab, Open IFC Viewer and ArcGIS Roads and Highways
  + Configured spreadsheet templates in the Bentley Open Roads Design Workspace for exporting roadway characteristics for shoulders, guardrails, sidewalks, pavement edge.
  + Exported roadway characteristics data from Open Roads Design and imported into ArcGIS Pro to investigate the BIM-GIS integration and test the feasibility of calculating the road with, shoulder width, sidewalk width using the exported files
  + Evaluated IFC file export using BlenderBIM software tool and assessed the feasibility of extracting roadway characteristics and geometry information from IFC file
  + Configured the design workspace for automating roads and roadway characteristics data export from design system to geospatial information system
  + Developed geoprocessing tools to calculate road width, sidewalk width, shoulder width, pavement width using the geospatial data exported from design to LRS.
  + Design workspace configuration for exporting sidewalks, shoulder, pavement data from Open Roads Design to GIS
  + Investigation of algorithms for extracting stationing and offset information from alignment data for referencing of assets exported from design to GIS
  + Development of geoprocessing tools for calculation of pavement width and sidewalk width
  + Updated tool to extract road information from design/construction models for delivery to TDOTs LRS systems
  + Investigated Bentley Open Roads and ArcGIS applications integration tools to develop recommendations for BIM-GIS integration
* **All States: AEGIST Guidebook**
  + Developed the road network and intersection modeling guidelines for different categories of business use cases.
  + Described the business use cases and their data modeling needs in the chapter on Enterprise GIS.
  + Update Road Network Data Modeling and Intersection Modeling chapter in the guidebook to remove “administration levels” and justifying modeling recommendations based on business use cases.
  + Incorporated comments and feedback received from GIS-T workshop into the sections in the guidebook
  + Updated Chapter 1 – Business Processes for Road Network Data Modeling and Executive Summary to reflect how road network data modeling requirements can be grouped and used to establish the road network data model
  + Held internal team review sessions on AEGIST Guidebook – route network modeling, intersection modeling and mapping of business requirements to LRS network.
  + Incorporated content from the AMPO conference presentation on requirements and modeling guidelines for building LRS to support Travel Demand modeling.
  + Updated guidebook chapters on routes and intersection modeling to define the modeling guidelines for building routable and connected road network
  + Created executive summary of the guidebook to summarize modeling guidelines and recommendations.
  + Documented AEGIST vision, goals and objectives and guidebook organization section
  + Conducted review meetings with expert panel members and stakeholders in the industry on Guidebook content and organization
  + Updated Chapter on Route Network data modeling in the sections on geometry accuracy, geometry integrity, single-dual carriageway, concurrent roads and network gaps
  + Updated Chapter on business processes to document information about routable road network data modeling requirements
  + Added information on intersection model for roadway pedestrian and roadway bike intersection.
  + Updated chapter 2 – business requirements for road network data model to capture information about use cases associated with different business process use cases
  + Updated chapter 3 – routes modeling to refine the guidelines for modeling route geometry, route name/identifier, route attributes, routability, temporality.
  + Resolved AEGIST Guidebook access for NCDOT reviewers
  + Updated chapter on business requirements for road network data modeling and added information about use cases associated with routability
  + Updated chapter on routes modeling by addressing comments on single/dual geometry modeling, road centerline accuracy modeling and routable network development
  + Updated sections on roadway pedestrian intersection modeling
  + Edited chapter on Asset information modeling to identify all the highway infrastructure assets (structural, drainage, pavement, utilities, traffic & safety, and right-of-way) that should be geospatially modeled to address various business use cases
  + Drafted approaches for locating assets using linear and coordinate referencing methods
  + Reviewed and edited chapter on Intersection modeling
  + Edited chapter on routes modeling to update sections on temporality and routability
  + Documented intersection modeling approach for roadway/pedestrian intersections
  + Updated glossary of terms and definitions

**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 3.2.x: Workshops and Presentations** 
   * **AEGIST Meeting of the Pooled Fund States**
   * **Conference Presentations**
     + Prepared presentation on AEGIST Guidelines for Travel Demand Modeling network development for the AMPO Conference
     + Developed abstract for the IHEEP conference to share information on geospatial data management and governance across enterprise systems as per AEGIST
     + Prepared presentation slides for the Columbus conference presentation on AEGIST. Presented recommendation on building and delivering geospatial roads data to travel demand modelers using open standards like Generalized Modeling Network Specification (GMNS).
   * **AMPO Conference**
     + Prepared presentation deck on road network data modeling for MPOs to support travel demand modeling
     + Delivered presentation at the AMPO conference to MPOs to inform them about AEGIST and the modeling guidelines for road network data model
   * **GIS-T** 
     + Presented at GIS-T on Route Network and Intersection Data Modeling
       - Presented definitions and use cases based on a 3 level approach for Route Network, Route Centerline Owner, Route Centerline Source, Route Centerline Type, At-Grade Intersections, Traffic Circle, Roundabouts, Restricted Crossing U-Turn, Median U-Turn, and Interchange modeling
       - Discussed AEGIST overlaps with other efforts such as MIRE and BIM for GIS
       - Identified a need for a more detailed definition on the purpose of the Levels proposed
         * Perhaps consider a matrix approach based off use cases
     + Determined a desire from States for the AEGIST Guidebook to emphasize use cases
       - "To accomplish this use case, you have to have to check these certain items off"
     + Determined that some states found Levels to be specifically useful in conversations with DOT decision makers when advocating for next steps or additional resources
       - WashDOT has used AEGIST Levels as a form of "road map"
     + Discussed definitions and differences of Roundabouts and Traffic Circles
       - Gathered a general consensus from the group on the definitions presented
       - Differences in business purposes contribute to differences in modeling methods across States.
       - Identified a need to consider at what point is a major access point such as a drive way considered an intersection in terms of modeling
     + Identified a need for more developed definitions on the differences between Route Multipart Geometry vs. Network Gaps vs. Coincident Route
     + Reviewed Mentimeter feedback responses from participants and collected any written responses received

**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 | Technical Services to ID, TN, CA, PA |
| Task 2\*\* | 2.26.2 | TASK 2 Technical Services - MONTH 33 - JUN 2022 | 6/30/22 | Technical Services to NC, KS, GA, WA, NM, MA |
| Task 2 | 2.27.1 | TASK 2 Technical Services - MONTH 34 – JUL 2022 | 7/30/22 | Technical Services to ID, TN, CA, PA |
| Task 2\*\* | 2.27.2 | TASK 2 Technical Services - MONTH 34 – JUL 2022 | 7/30/22 | Technical Services to NC, KS, GA, WA, NM, MA |
| Task 2 | 2.28.1 | TASK 2 Technical Services - MONTH 35 – AUG 2022 | 8/30/22 | Technical Services to ID, TN, CA, PA |
| Task 2\*\* | 2.28.2 | TASK 2 Technical Services - MONTH 35 – AUG 2022 | 8/30/22 | Technical Services to NC, KS, GA, WA, NM, MA |
| Task 2 | 2.29.1 | TASK 2 Technical Services - MONTH 36 - SEPT 2022 | 9/30/22 | Technical Services to ID, TN, CA, PA |
| Task 2\*\* | 2.29.2 | TASK 2 Technical Services - MONTH 35 – AUG 2022 | 8/30/22 | Technical Services to NC, KS, GA, WA, NM, MA |
| Task 2 | 2.30 | TASK 2 Technical Services - MONTH 37 - OCT 2022 | 10/30/22 | Technical Services to ID, TN, CA, PA |
| Task 2\*\* | 2.30 | TASK 2 Technical Services - MONTH 37 - OCT 2022 | 10/30/22 | Technical Services to NC, KS, GA, WA, MA |
| Task 2 | 2.31 | TASK 2 Technical Services - MONTH 38 - NOV 2022 | 11/30/22 | Technical Services to ID, TN, CA, PA |
| Task 2\*\* | 2.31 | TASK 2 Technical Services - MONTH 38 - NOV 2022 | 11/30/22 | Technical Services to NC, KS, GA, WA, MA |
| Task 2 | 2.32 | TASK 2 Technical Services - MONTH 39 - DEC 2022 | 12/30/22 | Technical Services to ID, TN, CA, PA |
| Task 2\*\* | 2.32 | TASK 2 Technical Services - MONTH 39 - DEC 2022 | 12/30/22 | Technical Services to NC, KS, GA, WA, MA |
| Task 2 | 2.33 | TASK 2 Technical Services - MONTH 40 - JAN 2023 | 1/30/23 | Provided technical services to States listed in this report. |
| Task 2\*\* | 2.33 | TASK 2 Technical Services - MONTH 40 - JAN 2023 | 1/30/23 | Provided technical services to States listed in this report. |
| Task 2 | 2.34 | TASK 2 Technical Services - MONTH 41 - FEB 2023 | 2/30/23 | Provided technical services to States listed in this report. |
| Task 2\*\* | 2.34 | TASK 2 Technical Services - MONTH 41 - FEB 2023 | 2/30/23 | Provided technical services to States listed in this report. |
| Task 2 | 2.35 | TASK 2 Technical Services - MONTH 42 - MAR 2023 | 3/30/23 | Provided technical services to States listed in this report. |
| Task 2\*\* | 2.35 | TASK 2 Technical Services - MONTH 42 - MAR 2023 | 3/30/23 | Provided technical services to States listed in this report. |
| Task 2 | 2.36 | TASK 2 Technical Services - MONTH 43 - APR 2023 | 4/30/23 | Provided technical services to Ohio, Washington, Georgia, California, |
| Task 2\*\* | 2.36 | TASK 2 Technical Services - MONTH 43 - APR 2023 | 4/30/23 | Provided technical services work for Connecticut and North Carolina. |
| Task 2 | 2.37 | TASK 2 Technical Services - MONTH 44 - MAY 2023 | 5/30/23 | Provided technical services to Ohio, Washington, Georgia, California, |
| Task 2\*\* | 2.37 | TASK 2 Technical Services - MONTH 44 - MAY 2023 | 5/30/23 | Provided technical services work for Connecticut and North Carolina. |
| Task 2 | 2.38 | TASK 2 Technical Services - MONTH 45 - JUNE 2023 | 6/30/23 | Provided technical services to Ohio, Washington, Georgia, California, |
| Task 2\*\* | 2.38 | TASK 2 Technical Services - MONTH 45 - JUNE 2023 | 6/30/23 | Provided technical services work for Connecticut and North Carolina. |
| Task 2 | 2.39 | TASK 2 Technical Services - MONTH 46 - JULY 2023 | 7/30/23 | Provided technical services to Ohio, Washington, Georgia, California, |
| Task 2\*\* | 2.39 | TASK 2 Technical Services - MONTH 46 - JULY 2023 | 7/30/23 | Provided technical services work for Connecticut and North Carolina. |
| Task 2 | 2.40 | TASK 2 Technical Services - MONTH 47 - AUG 2023 | 8/30/23 | Provided technical services to Ohio, Washington, Georgia, California, |
| Task 2\*\* | 2.40 | TASK 2 Technical Services - MONTH 47 - AUG 2023 | 8/30/23 | Provided technical services work for Connecticut and North Carolina. |
| Task 2 | 2.41 | TASK 2 Technical Services - MONTH 48 - SEPT 2023 | 9/30/23 | Provided technical services to Ohio, Washington, Georgia, California, |
| Task 2\*\* | 2.42 | TASK 2 Technical Services - MONTH 48 - SEPT 2023 | 9/30/23 | Provided technical services work for Connecticut and North Carolina. |
| Task 2 | 2.43 | TASK 2 Technical Services – MONTH 49 – OCT 2023 | 10/30/23 | Provided technical services work for North Carolina, California, North Dakota, Massachusetts. Developed intersection model for Kansas, New Mexico and Florida. |
| Task 2 | 2.44 | TASK 2 Technical Services – MONTH 50 – NOV 2023 | 10/30/23 | Provided technical services work for North Carolina, California, North Dakota, Massachusetts. Developed intersection model for Kansas, New Mexico and Florida. |
| Task 2 | 2.45 | TASK 2 Technical Services – MONTH 51 – DEC 2023 | 10/30/23 | Provided technical services work for North Carolina, California, North Dakota, Massachusetts. Developed intersection model for Kansas, New Mexico and Florida. |
| Task 2 | 2.46 | TASK 2 Technical Services – MONTH 52 – JAN 2024 | 1/31/24 | Provided technical services work for North Carolina, California, Arizona, Kansas, North Dakota, Massachusetts. |
| Task 2 | 2.47 | TASK 2 Technical Services – MONTH 53 – FEB 2024 | 2/29/24 | Provided technical services work for North Carolina, California, Arizona, Kansas, North Dakota, Massachusetts. |
| Task 2 | 2.48 | TASK 2 Technical Services – MONTH 54 – MAR 2024 | 3/31/24 | Provided technical services work for North Carolina, California, Arizona, Kansas, North Dakota, Massachusetts. |
| Task 2 | 2.46 | TASK 2 Technical Services – MONTH 52 – APR 2024 | 4/30/24 | Technical Services to PFS States |
| Task 2 | 2.47 | TASK 2 Technical Services – MONTH 53 – MAY 2024 | 5/30/24 | Technical Services to PFS States |
| Task 2 | 2.48 | TASK 2 Technical Services – MONTH 54 – JUN 2024 | 6/30/24 | Technical Services to PFS States |
| Task 3\*\* | 3.1.1 | **Article 1**: Road Network Publication Data Model with Topology, Temporality, Routable Network Rule | 5/30/21 | No longer in scope. Information prepared for this article to be merged in Guidebook. |
| Task 3\*\* | 3.1.2 | **Article 2:** Enterprise GIS Application for Spatial Safety Performance Functions Calibration and HSM-based Safety Analysis | 5/30/22 | No longer in scope. Information prepared for this article to be merged in Guidebook. |
| Task 3\*\* | 3.1.3 | **Article 3:** Engineering, processing and integrating spatial Traffic and Safety Data using Cloud | 12/30/22 | No longer in scope. Information prepared for this article to be merged in Guidebook. |
| 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 | No longer in scope. Information prepared for this article to be merged in Guidebook. |
| Task 3\*\* | 3.1.5 | **Article 5:** LRS Administration Levels and Maturity Mode | 9/30/24 | No longer in scope. Information prepared for this article to be merged in Guidebook. |
| 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 | GIS-T Workshop 2023 | 4/10/23 | Workshop on April 11th, 2023. Georgia and Arizona teams presented their data supply chain processes. |
| Task 3 | 3.3.1 | Webinar 1: Data Governance | 2/11/21 | Webinar delivered on Feb 11th, 2021 |
| 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 | Conducted Santa Fe Peer Exchange 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 and 2 (CLIN 0002 and CLIN0003)