# *Quarterly Progress Report (QPR)*

# *Applications of Enterprise GIS in Transportation*

**Progress Report for Quarter 6 [January 1st 2021 – March 31th, 2021]**

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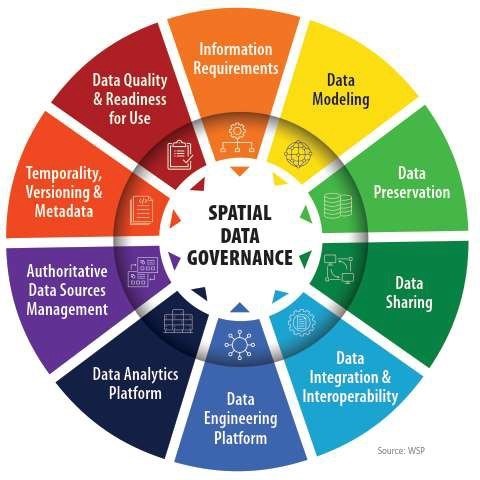
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Description automatically generatedWSP Technical Lead: Abhishek Bhargava (abhishek.bhargava@wsp.com)

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 September 30, 2024

Total Time, months: 60

Time Expended, months: 19

Percent Calendar Time Expended: 30%

Work Accomplished This Reporting Period: Jan – Apr, 2021

**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**:

* Established agenda and plan for 2021 Quarterly meetings with the PFS States. Sending calendar invites to States.
* Conducted Quarterly Meeting 5 with PFS States in March 2021
* Prepare and delivery AEGIST Quarterly Report #5 along with invoice for the period (January – April 2021)
* Base period extended and will end in May 2022, instead of May 2021. Contract modification executed.

**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**: Following technical services activities were carried out for each of the listed States in Base Period.

* **Idaho:**
  + Task 2.ID.2: Spatial data governance activities continued
    - Data Portfolio (Catalog) developed with high-priority data assets & road network conflation framework, depicted by data lineage (flow) diagram between DOTs and local agencies
    - Presentation at GIS-T (April 2021) on Data Governance.
    - HPMS Data Quality Rules were configured in FME. Data governance vision and next steps for enterprise deployment was discussed.
    - Scope for additional technical services developed for Idaho.
  + Task 2.ID.3: Conflation of Federal Roads data with DOT LRS and County Roads data.
    - ArcGIS geoprocessing tool (python-based) developed for conflating Federal Lands Management Agency (FLMA) and DOT LRS data.
    - Testing of conflation tool performance was done
* **California**
  + Task 2.CA.1: Statewide Roads data modeling and data exchange architecture
    - Review of roads data modeling practices and rules at Caltrans, CalOES and Merced County.
    - Architected roads data modeling rules for implementation in Caltrans 1Integrate tool.
    - Comparison of roads data rules in NG911 NENA, US Census (Tiger), ARNOLD & AEGIST manuals
  + Task 2.CA.2: ArcGIS Hub deployment between Caltrans, CalOES and Counties
    - Reviewed ArcGIS web services and roads data publication platform at Merced County
* **Tennessee**
  + Task 2.TN.1: Strategic work plan for GIS-LRS, Maintenance, Safety, Planning, Structures Groups
    - Draft 4-year roadmap of strategic work plan activities delivered for DOT review.
    - Proposed 4-year roadmap shows spatial data integration, data modeling, management and governance activities that can be taken on by the DOT for meeting the needs of GIS-LRS Safety, Planning, Maintenance and Structures groups.
    - Coordinated with the DOT to gather feedback on the strategic plan from business stakeholders, and determine next steps (e.g.: presentation to commissioner, deputy commissioner and other senior management on spatial data governance vision and goals at DOT)
    - Presentation of TDOTs strategic workflow to Idaho Transportation Department for feedback
* **Connecticut**
  + Task 2.CT.1: HPMS data quality rules were configured in FME (Feature Manipulation Engine).
  + Task 2.CT.2: Continued development of the GIS Tool for extracting and transforming Connecticut DOTs Roads, Intersection data into AEGIST recommended road network publication data model (with topology, routability and temporality rules). This AEGIST road network data model was developed based on open standards from FHWA (AROLD, HPMS, MIRE), Open Geospatial Consortium (OGC).
* **Pennsylvania**
  + Task 2.PA.1: AEGIST Technical services work plan development

Following technical services were identified for delivery to PennDOT over the base period

* + - Task 2.PA.2: Traffic Count Site Selection Algorithm Review and Recommendations
    - Task 2.PA.3: Safety crash data integration, engineering, processing and publication
    - Task 2.PA.4: Geocoding workflow automation
    - Task 2.PA.5: Horizontal and vertical curves geoprocessing tool review and updates
  + Task 2.PA.2: Traffic Count Site Selection Algorithm Review and Recommendations
    - Completed review of the clustering algorithm created by PennDOT Traffic group for selection of temporary traffic count sites samples.
    - Presented findings and recommendations to PennDOT Traffic and Safety group.
  + Task 2.PA.3: Safety crash data integration, engineering, processing and publication
    - Review current safety data integration, engineering and publication process
    - Identified two opportunities for improvement by automation in current process
    - Identified actions that need to be taken to setup the development environment
* **Ohio**
  + Task 2.OH.1: Technical services work plan was developed. A task for creating a 4-year strategic roadmap was scoped, with ten (10) focus areas and work schedule was developed.
  + Task 2.OH.2: Strategic work plan development was started. Sprint 1 was executed. Focus during this sprint was on identifying activities that need to be taken on for (a) HPMS-ARNOLD-MIRE data modeling and preparation and (b) LRS-GIS Database administration.

**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**:

* **Task 3.1.x – AEGIST Articles**
  + **Task 3.1.1 - Article 1**: Submitted content for Article 1 on “Road Network Publication Data Model with Topology, Temporality, Routable Network Rules” as part of Task 5 Report. Coordinating with FHWA to determine next steps, including (a) development of a TRB 2022 Article. (b) review of content.
  + **Task 3.1.2 - Article 2:** Developed scope & objectives for AEGIST Article 2 on ***“****Enterprise GIS Application for Spatial Safety Performance Functions Calibration and HSM-based Safety Analysis”*
  + **Task 3.1.3 - Article 3:** Developed scope & objectives for AEGIST Article 3 on ***“****Enterprise GIS Application to Identify Optimal Location of Traffic Monitoring Sites based on Enterprise Needs”*
  + **Task 3.1.4 - Article 4:** Developed scope & objectives for AEGIST Article 4 on **“***Enterprise GIS Application for**Modeling and Conflating Federal Lands Management Agency, DOT LRS and Local Agency Roads data*”
* **Task 3.2.x – AEGIST Workshops & Presentations**
  + **Task 3.2.1** - **GIS-T 2021 AEGIST Workshop Delivered**: Prepared presentation with Arizona and Connecticut DOTs and delivered presentation at GIS-T in April 2021. Focus on the presentation was on: Spatial Data Modeling for Roads, Intersections, Roadway Characteristics. Building Routable Network with Road Segments, Junctions, and Intersections
  + **Task 3.2.3** – **TRB 2022 AEGIST Workshop** **Plan Prepared**: A writeup was delivered to AED-40 TRB Committee on AEGIST Workshop Objectives, Products/Outcomes. AEGIST coordinating with Building Information Modeling (BIM) workshop group to collaborate and conduct the workshop together.
  + **Task 3.2.4**: **AEGIST Presentations (2021)**
    - Presentation to USDOT and FHWA stakeholders delivered on April 2nd (2021) by Joseph Hausman (FHWA), Abhishek Bhargava (WSP) and Jag Mallela (WSP). USDOT and FHWA attendees included: Brian Gardner (FHWA), Rob Elliott (FHWA), Steve Lewis, Amy Nelson, Kenneth Petty, Brian Brotsos, David Winter, Thomas Roff, Justin Clarke, Chris Allen, Tom Harman, Cheryl Richter, Brian Fouch, Dana Gigliotti
    - AEGIST Overview, Goals & Objectives presentation to new PFS States (WVDOT and DC DOT).
    - Colorado DOT (non-PFS State) was provided the AEGIST Road Network Publication Data Model report and AEGIST GIS-T Workshop presentation deck, along with invite to ask any AEGIST related follow-up questions. Colorado DOT is looking to work on its Intersection data model in 2021, and also looking to create a GIS-LRS data publication standard to provision road network data for enterprise use.
    - Prepared outline for following presentations
      * NaTMEC Virtual Conference, June 21st - 25th
      * Traffic Records Forum Conference, August 16th – 20th
* **Task 3.3.1: AEGIST Webinars** 
  + **Webinar 1** delivered on Feb 11th 2021. Topic of the webinar was “Spatial Data Governance for supporting Enterprise Business Users and Systems”. In this webinar presentations were made by New York, Florida and Ohio State DOTs. The objective was to introduce AEGIST to data offices and data governance councils at State DOTs. Webinar was attended by 150-190 participants and was advertised to all 50 State DOTs.
  + **Webinar 2** scheduled on Aug 12th, 2021. Topic of this webinar is: “Spatial Data Integration and Engineering Platforms, Applications and Governance”. Potential topics and presenters were identified. Following presentations will likely be made by AEGIST PFS Team:
    - Data Engineering Platform Applications and Governance at **Pennsylvania DOT**: Safety Crash Dataset Engineering and Publication; and, Horizontal and Vertical Curves Data Engineering using SQL, Python Tools
    - Data Engineering platform applications and governance at **Idaho Transportation Department (ITD):** at ITD Federal Lands and DOT LRS Data Conflation and Engineering using ArcGIS
    - Data Engineering platform applications and governance **Ohio DOT:** Design (CAD) to GIS Data Migration and LRS Data Publication using FME (Feature Manipulation Engine)

**Task 5: HPMS Remodeling Support Services**

**Task Objective:** HPMS 9.0 Remodeling Support services

**Activities:**

* Completed and delivered report to FHWA on proposed road network publication data model. Incorporated data modeling requirements associated with building a topologically connected, routability and temporal roads data model.
* Opened review of the proposed road network publication data model to following PFS States: DC DOT,
* Setup a call with FHWA to discuss next steps associated with the report/article and discuss updates from the National Roads Pilot and HPMS 9.0 deployment projects.

Work Planned for Next Reporting Period: May – Dec 2021

**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**:

* Conduct Quarterly Meeting 6 with PFS States in July 2021
* Coordinate with following PFS States to determine kickoff date and technical services activities scope for AEGIST performance period 1: North Carolina, Washington, Kansas, New Mexico, Florida. Identify 5 States.
* Prepare and Deliver AEGIST Quarterly Report #7 for the period (May –December 2021)
* Prepare and review agenda for PFS States Quarterly Meetings #7 and #8 in July and November 2021. Publish agenda, presenters and details at <https://gisintransportation.com/>. Tentative agenda:
  + AEGIST Updates [1 Hour]: Presentation, discussion and updates on AEGIST Activities including: State DOT Technical Services, Workshops, Webinars and Articles
  + Spatial Data Engineering Platform [1 Hour]: Architecture of Spatial Data Engineering Platforms, including Applications and Tools that are typically used on the Platform; and Data Engineering Governance Policies
  + Example Case Studies and Presentations on Spatial Data Engineering Platforms, Applications and Tools [1 Hour]
    - Idaho FME and ArcGIS Platform for System of Engagement; Detailed presentation in Webinar 2.
    - Pennsylvania Jupyter and ArcGIS Platform. Detailed presentation in Webinar 2.
    - Ohio FME and ArcGIS Platform. Detailed presentation in Webinar 2.
    - Connecticut FME and ArcGIS Platform
    - Colorado Google Cloud and AWS Platform for System of Engagement

**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**:

* **Idaho:** 
  + Task 2.ID.2: Continue work on Spatial Data Governance and HPMS Data Quality; and,
  + Task 2.ID.3: Continue testing and improvements to Roads Data Conflation tool.
  + Prepare for presentation of deliverables from above tasks at AEGIST Quarterly Meeting (July 17th) and AEGIST Webinar 2 (Aug 12th)
  + Prepare with ITD for Data Summit being held at Idaho in October 2021, focusing on data engineering platform governance and data engineering platform tools/applications.
* **California**
  + Task 2.CA.1: Continue work on State Roads Data Modeling and Exchange Architecture. Prepare and submit deliverables.
  + Task 2.CA.2: Coordinate with Caltrans, CalOES and Merced County on ArcGIS Hub Pilot (for Roads data editing and exchange;
* **Tennessee**
  + 2.TN.1: Complete Strategic Work Plan Review with Tennessee. Identify activities in the strategic work plan that can be taken on to wrap up Base Period by May 2022.
* **Connecticut**
  + 2.CT.1: Continue HPMS data quality rules configuration in FME.
* **Pennsylvania**
  + Start technical services on Tasks 2.PA.3, 2.PA.4 and 2.PA.5. Identify additional services & prepare scope.
* **Ohio**
  + Develop roadmap of actions for technical services areas identified in work plan. Execute sprints.
  + Prepare for deep dive presentation on CAD to GIS data exchange and data engineering platform
  + Coordinate with Travel Demand Modeling group for preparing data on
* Coordinate with following States to develop scope of AEGIST Technical services and determine schedule of activities during AEGIST Performance Period 1. Start delivering technical services and launch AEGIST Performance Period 1 with these States (or potentially other States, if any of these States wants to Start later)
  + North Carolina
  + New Mexico
  + Washington
  + Florida
  + 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**:

* **Task 3.1.x: AEGIST Articles:**
  + **For Article 1 (Task 3.1.1),** coordinate with FHWA to determine next steps for review/updates and for development of TRB 2022 paper. Discuss coordination opportunities with NENA and other agencies to establish consistent roads data modeling rules. Create and submit TRB article in coordinate with FHWA (if FHWA plans to submit the Article). Align this activity with AEGIST Cross-Agency Tasks 2.1 and 2.2.
  + **For Article 2 (Task 3.1.2),** engineer data for analysis and develop spatial statistics, spatial econometric and AI/ML models to show how GIS-based safety performance analysis tools can support Highway Safety Improvement Program (HSIP) development. Coordinate with Connecticut, North Carolina, California, Kansas and/or other PFS States that would like to share Crash, MIRE and Roadway Characteristics data. Align this activity with AEGIST Cross-Agency Tasks 2.1 and 2.2 to showcase how AEGIST Guidebook v2 rules and data model can be used for Highway Safety Analysis (and other such transportation data analysis in Asset Management, Planning and Programming). Report findings at TRF Conference (2021).
  + **For Article 3 (Task 3.1.3),** Conduct analysis to demonstrate Applications of Enterprise GIS for Identifying Optimal Location of Traffic Monitoring Sites. Report findings at NaTMEC Conference (2021).
  + **For Article 4 (Task 3.1.4),** collaborate with FHWA, Idaho and California to further develop the rules for Roads data modeling conflation. Discuss opportunities to collaborate with NENA and other stakeholders in the industry (e.g. University of Kentucky- Transportation Center) to identify and integrate roads data conflation tools and standardize roads data modeling rules. Align these activities associated with this article with California Task 2.CA.1 and Idaho Task 2.ID.3. Discuss if other PFS States would like to coordinate technical services and contribute towards development of this Article.
  + **For Article 5 (Task 3.1.5),** coordinate with Travel Demand Modeling groups in Connecticut, Ohio to establish how LRS data will be used as the starting point to develop the road network and roadway characteristics data for travel demand modeling. At July 2021 webinar, identify PFS States that would be interested in pilot that involves extracting data from LRS and engineering data for travel demand modeling systems using concepts and principles identified in Article 1 (Task 3.1.1). Align the activities associated with this Article development and the following AEGIST Technical Services activities: Task 2.1, Task 2.2, Task 2.OH.2. Discuss if other PFS States would like to coordinate technical services and contribute towards development of this Article.
* **Task 3.2.x – AEGIST Workshops & Presentations**
  + **Task 3.2.4:** Prepare and deliver presentations for
    - NaTMEC Virtual Conference, June 21st - 25th
    - Traffic Records Forum Conference, August 16th – 20th
* **Task 3.3.1: AEGIST Webinars - Webinar 2** preparation and delivery on Aug 12th, 2021.
  + Coordination with identified presenters/presenting States to deliver key messages related to data engineering platform architecture and platform governance policies – based on both AEGIST activities and DOT activities outside of AEGIST. As presented in previous section on work accomplished in Jan-Apr Reporting period, State DOTs tentatively identified for presentation include: Pennsylvania, Idaho, Ohio.
  + Preparation of use cases and prototypes for demonstration of required technical architecture and governance infrastructure for spatial data engineering platforms (and applications on these platforms)
  + Align Webinar Presentations with following AEGIST Technical Services activities:
    - 2.PA.3, 2.PA.4 and 2.PA.5: Pennsylvania data engineering platform and enterprise GIS apps.
    - 2.ID.2: Spatial Data Governance
    - 2.OH.2: AEGIST Strategic Roadmap/Work Plan for GIS-LRS Activities (including BTRS Data Publication, Data Engineering and Publication for Safety and Travel Demand Modeling)

**Task 5: HPMS Remodeling Support Services**

**Task Objective:** HPMS 9.0 Remodeling Support services

**Activities:** Coordinate with FHWA to determine next steps for review and updates to report. Align with Task 3.1.1.

**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 prepared. QTR Meeting (Dec 2020) |
| Task 1 | 1.3.6 | Progress Report 6: Jan-Apr 2021 (incl. quarterly meet) | 4/31/21 | QPR-6 prepared. QTR Meeting (Mar 2021) |
| Task 1 | 1.3.7 | Progress Report 7: May-Aug 2021 (incl. quarterly meet) | 8/30/21 | Not Started |
| Task 2 | 2.1 | TASK 2 Base Period 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 Base Period 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 Base Period 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 Base Period 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 Base Period 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 Base Period 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 Base Period 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 Base Period 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 Base Period 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 Base Period 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 Base Period 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 Base Period Technical Services - MONTH 20 - MAY 2021 | 5/30/21 | Started. Continuing delivery of technical services to ID, TN, CA, PA, CT, OH and for Cross-agency Tasks 2.1 & 2.2. |
| Task 2 | 2.14 | TASK 2 Base Period Technical Services - MONTH 21 - JUN 2021 | 6/30/21 | Not Started |
| Task 2 | 2.15 | TASK 2 Base Period Technical Services - MONTH 22 - JUL 2021 | 7/30/21 | Not Started |
| Task 2 | 2.16 | TASK 2 Base Period Technical Services - MONTH 23 - AUG 2021 | 8/30/21 | Not Started |
| Task 2 | 2.17 | TASK 2 Base Period Technical Services - MONTH 24 - SEP 2021 | 9/30/21 | Not Started |
| Task 2 | 2.18 | TASK 2 Base Period Technical Services - MONTH 25 - OCT 2021 | 10/30/21 | Not Started |
| Task 2 | 2.19 | TASK 2 Base Period Technical Services - MONTH 26 - NOV 2021 | 11/30/21 | Not Started |
| Task 2 | 2.20 | TASK 2 Base Period Technical Services - MONTH 27 - DEC 2021 | 12/30/21 | Not Started |
| Task 2 | 2.21 | TASK 2 Base Period Technical Services - MONTH 28 - JAN2022 | 1/30/22 | Not Started |
| Task 2 | 2.22 | TASK 2 Base Period Technical Services - MONTH 29 - FEB 2022 | 2/30/22 | Not Started |
| Task 2 | 2.23 | TASK 2 Base Period Technical Services - MONTH 30 - MAR 2022 | 3/30/22 | Not Started |
| Task 2 | 2.24 | TASK 2 Base Period Technical Services - MONTH 31 - APR 2022 | 4/30/22 | Not Started |
| Task 2 | 2.25 | TASK 2 Base Period Technical Services - MONTH 32 - MAY 2022 | 5/30/22 | Not Started |
| Task 3 | 3.1.1 | **Article 1**: Road Network Publication Data Model with Topology, Temporality, Routable Network Rules | 5/30/21 | Delivered content of the article as part of Task 5 Report on Road network publication data model. FHWA and following PFS States reviewing: DC, ID, NC, OH. |
| Task 3 | 3.1.2 | **Article 2:** Enterprise GIS Application for Spatial Safety Performance Functions Calibration and HSM-based Safety Analysis | 5/30/22 | Connecticut, North Carolina, Kansas and California Safety datasets being engineered and evaluated for analysis. First milestone/ presentation made at GIS-T 2021 on spatial analysis techniques. Second milestone or presentation to be made in July 2021, at the PFS States Quarterly meeting |
| Task 3 | 3.1.3 | **Article 3:** Enterprise GIS Application to Identify Optimal Location of Traffic Monitoring Sites based on Enterprise Needs | 12/30/22 | California and Connecticut data being reviewed for application development |
| 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 | AEGIST Technical Services being delivered to ITD, Caltrans, CalOES and Merced being leveraged for development of this article and for communicating the need for synchronization of roads data modeling practices at DOT and local agencies. |
| Task 3 | 3.1.5 | **Article 5:** Preparing routable network from LRS routes and MIRE-HPMS-ARNOLD data items for Travel Demand Modeling | 9/30/24 | Coordinating with Travel Demand Modeling groups at DOTs and Routing experts in the industry to build routable network from LRS by factoring in specifications from OSM, GMNS, SharedStreets, etc. |
| 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 3 – TRB 2022 | 1/30/21 | Planning Started |
| Task 3 | 3.2.4 | AEGIST Presentations (2021) |  | USDOT Presentation on April 2nd.  Presentations to new PFS States: **WV, DC**  Provided AEGIST Overview to **Colorado.**  Preparation started for following:  - **NaTMEC** Conference (June, 2021)  - **Traffic Records Forum** (Aug, 2021) |
| 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: Spatial Data Integration & Engineering | 8/12/21 | Planning Started |
| 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 – 2021 | TBD | Not Started. Likely to be moved to 2022. |
| 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. Developed draft ERDs to depict conceptual/local data model entities and relationships. |