The Texas Freight Network Technology and Operations Plan (FNTOP) developed by the Texas Department of Transportation (TxDOT) Freight Planning Branch builds upon the goals introduced in the 2018 Texas Freight Mobility Plan (TFMP) and outlines potential strategies to guide technology- and operations-related investments on the Texas Multimodal Freight Network (TMFN).

The IMPLEMENTATION PLAN describes the actions needed to help facilitate the initiation and scalability of the 10 FNTOP recommended strategies below, as well as the steps necessary to transition them from planning to deployment. Based on feedback from TxDOT and key public and private sector stakeholders, these strategies have been specifically recommended as they are better positioned for near-term implementation based on anticipated value added to operation of the TMFN, ease of implementation, and their ability to address high-priority FNTOP stakeholder needs.

FNTOP Strategies Selected for Concept of Operations Development.
The *Implementation Plan* includes a time-phased series of activities that are needed to accomplish the planning, implementation, and eventual full deployment of the 10 FNTOP recommended strategies. These activities are summarized across three phases as follows:

<table>
<thead>
<tr>
<th>Near-Term Actions</th>
<th>Medium-Term Actions</th>
<th>Long-Term Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>This presents the activities that can be conducted within 0-2 years—once the implementation planning activities commence—that will provide the planning and systems engineering baseline such that TxDOT will be able to move forward with site selection and system deployment/procurement.</td>
<td>This presents the steps that can be conducted within 2-5 years of implementation, encompassing initial deployments, pilot projects, and phased rollouts of these strategies.</td>
<td>This presents the steps associated with the long-term sustained operations and maintenance activities that can be conducted within 5-7 years of implementation and are needed to support full deployment of these strategies.</td>
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Five key recommended supporting actions to facilitate successful strategy implementation are as follows:

1. **Leverage the current FNTOP momentum** that has been established in working with the TxDOT Divisions to support the implementation planning activities.

2. Expand TxDOT internal stakeholder involvement in the FNTOP to the TxDOT Districts to **identify site opportunities** for pilot project deployment, and to **develop regional champions**.

3. Leverage the FNTOP stakeholder participation to **expand both external public sector agency involvement and private sector freight and technology involvement and buy-in** as relevant to the individual strategies.

4. **Coordinate within TxDOT regarding funding sources**. Identify internal sources, regional partnerships to support deployment (public and private), and United States Department of Transportation grant program funding.

5. **Formalize a FNTOP Working Group or leverage an existing related working group** and conduct regular meetings (e.g., at least bi-annually); this public-private group would act as a stakeholder advisory committee for the FNTOP *Implementation Plan*.

The final recommendation in the list above—formalize a FNTOP Working Group—represents a longer term recommended action that should begin at the onset of and continue beyond the near-term actions for strategy implementation, and would support all implementation phases. Over time, this group can be leveraged to recommend supplemental technologies, data sharing opportunities, new technology projects, and stakeholder outreach based on the changing nature of transportation and technologies in Texas and in the U.S.
RECOMMENDATIONS AND IMPLEMENTATION PLAN

NEAR-TERM ACTIONS

The following set of activities, collectively referred to as ADVANCING THE FNTOP CONCEPTS OF OPERATIONS, is recommended for the NEAR-TERM (0-2 years) once the implementation planning activities commence, to prepare each of the six FNTOP strategies selected for Concept of Operations development for potential future deployment:

► Identify lead TxDOT Divisions and agency champions;
► Coordinate with regional partners, including TxDOT Districts, local supporting agencies, and private sector partners on planning for strategy deployment;
► Assess TxDOT system capabilities that need to be integrated, as well as the condition of the existing equipment and FNTOP-identified adjustments to existing TxDOT policies that may be necessary upon activation of these strategies;
► Perform a site selection assessment (including initial and phased roll-out locations);
► Determine/finalize infrastructure and equipment, as well as data needs and standards;
► Develop formal System Requirements Specification documentation;
► Develop High-Level Design documentation;
► Develop an independent implementation cost estimate;
► Develop scope inputs to support TxDOT moving forward with deployment/pilot project procurement;
► Develop performance metrics to evaluate the effectiveness of each strategy, support benefit-cost analyses, and help address federal reporting requirements; and
► Develop a cross-cutting Communications Plan with protocols for communications and data sharing between TxDOT Divisions, Districts, regional partners, local supporting agencies, and private sector partners; this Communications Plan will also help provide education regarding the technologies included in each strategy.

MEDIUM-TERM AND LONG-TERM ACTIONS

Once ADVANCING THE FNTOP CONCEPTS OF OPERATIONS is complete, in the MEDIUM-TERM (2-5 years), the six FNTOP Concepts of Operations strategies would advance into procurement and implementation, while the recommended near-term actions could be applied to the other four FNTOP recommended strategies.

► PROCUREMENT—Options include design-bid-build, design-build, or alternative methods of initial deployment (e.g., Public-Private Partnerships [PPPs], grant-supported projects).

► IMPLEMENTATION—This is when detailed design, construction, integration, testing, and initial operations would be implemented; this is informed by the materials developed during ADVANCING THE FNTOP CONCEPTS OF OPERATIONS near-term actions as previously described.

Following implementation, most or all of the advanced strategies enter the Operations and Maintenance phase in the LONG-TERM (5-7 years).

► ONGOING OPERATIONS AND MAINTENANCE—At this point, all aspects of the strategies would have been deployed, with some strategies receiving incremental expansions as new sites are brought online.

As part of the long-term steps, TxDOT should maintain funding to support the programs, as well as document lessons learned to support future TxDOT initiatives or offer guidance to peer states looking to implement similar systems. Additionally, the FNTOP Implementation Plan should be revisited, updated, and revised periodically, both to reflect the evolution of the program, and to be responsive to freight transportation stakeholders and developments in freight transportation automation and information systems.
The 10 FNTOP recommended strategies could be implemented together, in functional groups, or as stand-alone systems. The Conceptual Framework was developed to highlight areas of complementary technology use and integration across the strategies and existing TxDOT systems.

Currently, each Traffic Management Center (TMC) manages and operates its own Intelligent Transportation System (ITS) field equipment and Advanced Traffic Management System (ATMS). The five strategies in **BLUE** are well suited to be monitored at a regional level, with the potential to integrate some of the required ITS components into the TxDOT ATMS platform.

The five strategies in **GREEN** would require integration into TxDOT's centralized ITS network architecture and the enhancement of existing information sharing channels.