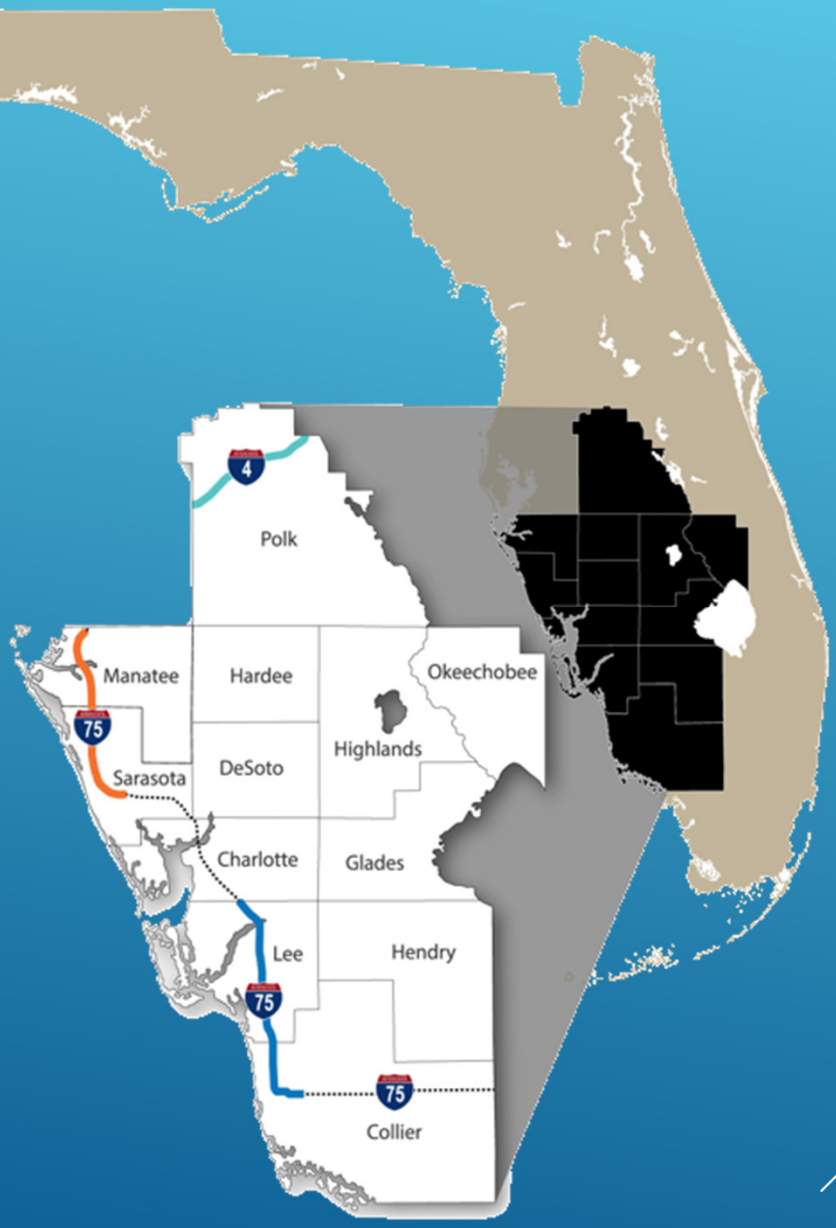
FDOT – District One



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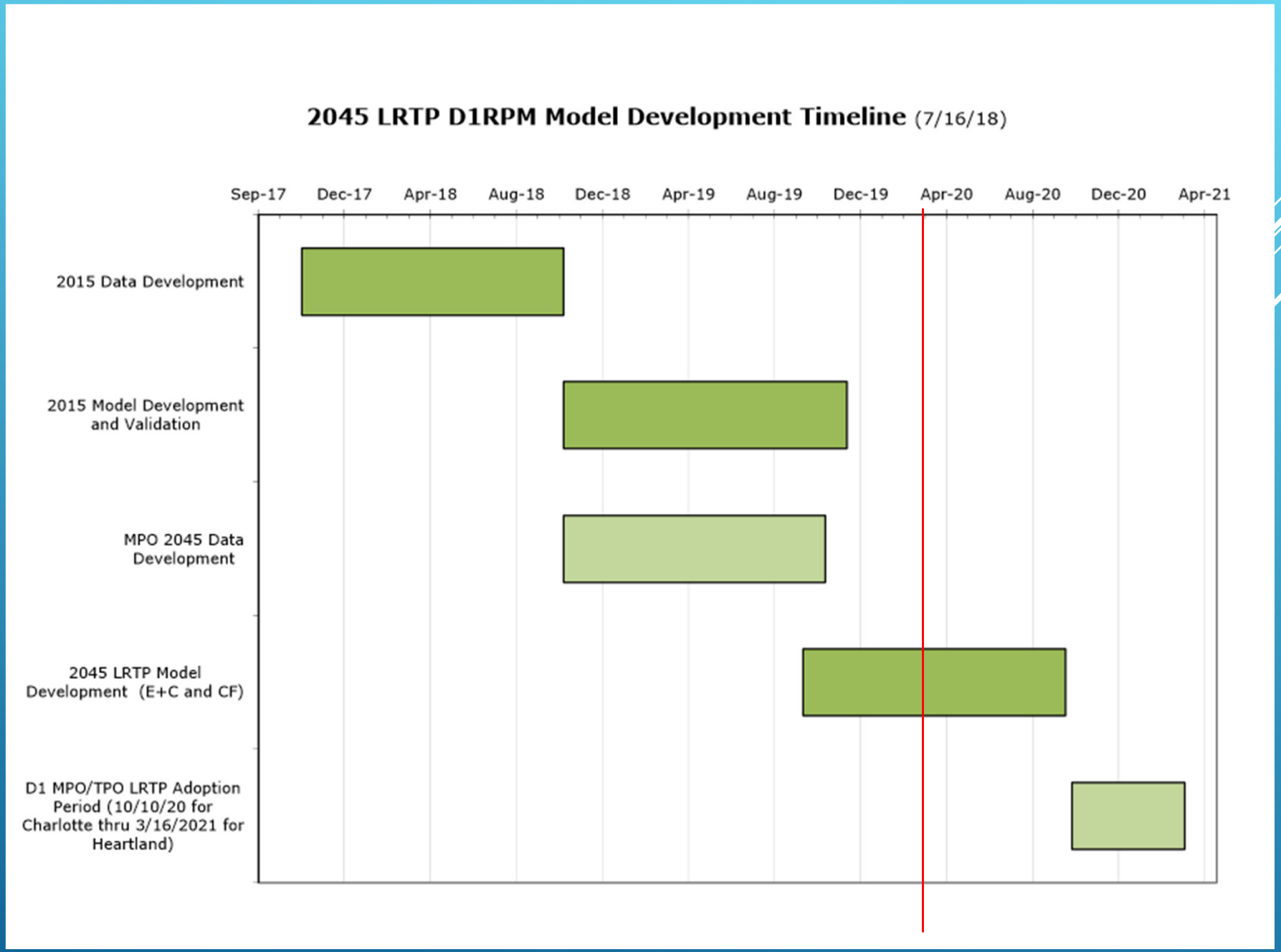
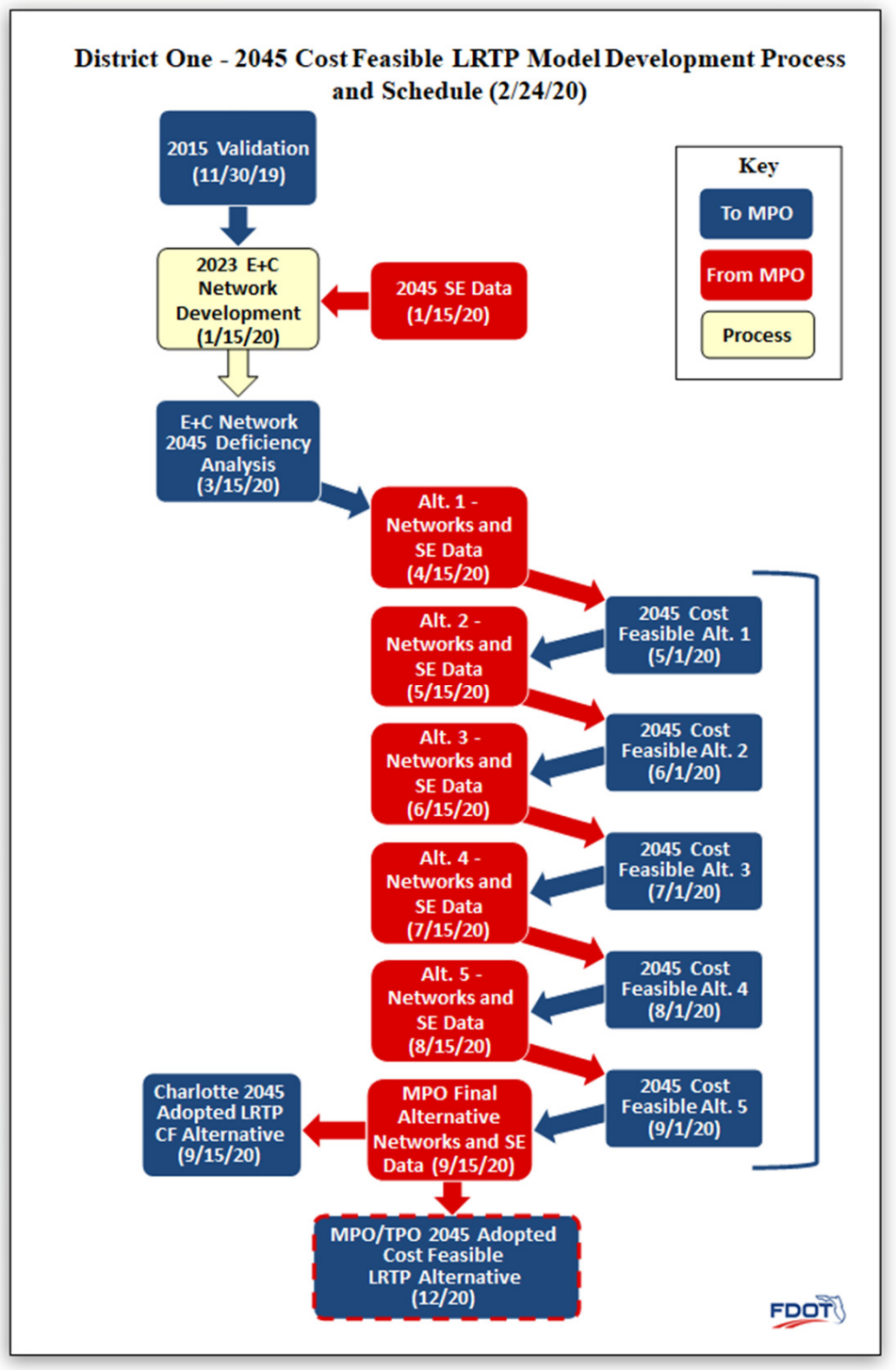
The 2015-2045 D1RPM v2.0



The 2015-2045 D1RPM v2.0



Model Enhancements

- AADT Assignments
- Reduced Run Time (Transit Optional)
- New Mode Choice Procedure
    - Transit Project Mode (BRT/LRT)
    - Bike and Ped Modes
- Add Punta Gorda Airport
- Short and Long Work Trips
- Enhanced Reporting
- CAV Procedure

Enhanced Reporting

- Visualize and Display Activity-Based-Model Output
- Visualize and Display Activity-Based-Model Output
- Works just as well for trip base models
- Make it Easy and Routine – Standard Model Reporting
- Introduce New Software and Methods
- Provide a "starting point" for New Reporting Standards
- Output=html
    - Screen
    - Web
    - Reports
- Currently in use for model validation

The 2015-2045 D1RPM v2.0

IMPLEMENTATION OF CAV CAPABILITIES IN THE MPO/TPO 2045 LONG-RANGE TRANSPORTATION PLAN (LRTP) UPDATES

In consideration of Federal and State legislative guidance, FDOT District 1 proposes to assist District MPO/TPOs in the development of their upcoming 2045 LRTP Updates by incorporating these model procedures within the D1RPM, as deemed appropriate, as an initial step in addressing the potential effects of CAV on roadway capacity.

PURPOSE

In light of emerging technologies and State legislative guidance (Appendix 1), Metropolitan Planning Organizations (MPO/TPO) must address the potential effects of Connected and Autonomous Vehicles (CAV) in developing their 2045 Long-Range Transportation Plan (LRTP) updates. Validation of the D1RPM is currently underway by the Florida Department of Transportation (FDOT) District 1 with MPO/TPO alternative testing scheduled for completion prior to the adoption of the MPO/TPO LRTPs in 2020/21. The purpose of this white paper is to explore the potential effects of Level 2 and Level 3 CAV on traffic forecasting in developing the new 2015-2045Regional Planning Model (D1RPM) and explain steps the District is taking to assist the MPO/TPOs in addressing these new requirements.

INTRODUCTION

The new automotive technologies addressed in this paper include adaptive cruise control, traffic incident warning, and self-parking systems provided by some new car models on the road today. Defined by US DOT as "levels 2-3 automation", these vehicles are anticipated to provide safer and more efficient travel as their numbers increase and become a significant portion of vehicles on Florida's roadways. For example, studies have shown that by providing safer and more efficient spacing or platooning between vehicles, these CAVs can potentially bring significant increases in roadway capacity with reductions in vehicle collisions.

While we may continue to speculate about when the next level of fully autonomous vehicles "levels 4-5 automation" will become a significant portion of the vehicle mix, it is understood this level of technology has the potential to fundamentally change transportation infrastructure planning, engineering, and operations. It also promises to expanded mobility for the very young, the elderly, and the disabled and may substantially lower travel costs for all.

According to 2018 FDOT "Guidance for Assessing Planning Impacts and Opportunities of Automated, Connected, Electric and Shared-Use Vehicles (ACES)", Level 3 automation may represent 30% to 60% of the vehicle fleet by 2035 (see table A2-1 in Appendix 3). As previously mentioned, this significant increase could yield an increase in roadway lane capacity. Therefore, our discussion begins by considering the impact this may have on the development and use of the 2045 D1RPM model in District One.

MODEL PLANNING ELEMENTS

With respect to Travel Demand Forecasting, the FDOT report "*Emerging Technology, Demographic Changes, and Travel Behavior; Trends, Key Parameters, and Scenarios*", FDOT-2016" proposes several key parameters in modeling CAV technology.

- Capacity of Freeway and Major Arterial Segments associated with reduced headway
- Trip Generation/Generational Effects associated with 0 car households and unlicensed driver mobility
- Highway Assignment

with trip length
ɪsts)

ɨt the potential effects of many of these
increases in roadway capacity due to the
ɣys, or following distance, of Level 2 and 3
y.

AV IMPROVEMENTS

ɨdel Task Force (MTF) meetings, the 2045
en improved to include features that allow
of CAV. These features include:

nine the proportion of CAV in the vehicle

ɔf CAV on roadway capacity based on fleet

d for exclusive use by CAV resulting in a

ɨe D1RPM are as follows:

en included in the roadway network on I-4
Manatee County; and on I-75 in Lee and

ɔes is modified according to the current
ɨh is in use.

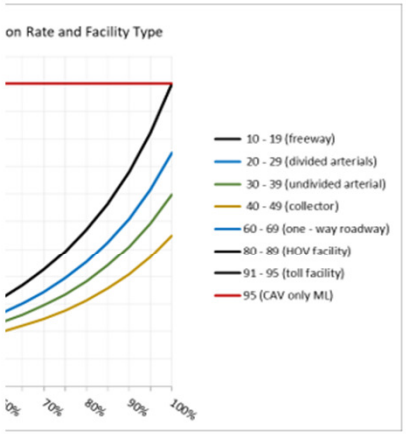
es for identification of CAV and non-CAV
el time pathing.

es for identification of CAV and non-CAV

h a special *'linkgroup"* code which enables Special-Use
y by CAV.

ified to reflect inclusion of CAV.

ɪctors by CAV Penetration Rate and Facility Type was
ɨth Professor Xiaoping (Shaw) Li, PhD with the Center
TR) at the University of Florida, USF, to reflect his
s in testing autonomous vehicles. Dr. Li's research
e estimate of the effects of platooning and CAV fleet
ɨditional data on potential capacity effects are included



APABILITIES IN THE MPO/TPO 2045 LONG-RANGE

In consideration of Federal and State legislative guidance, FDOT District 1 proposes to assist District MPO/TPOs in the development of their upcoming 2045 LRTP Updates by incorporating these model procedures within the D1RPM, as deemed appropriate, as an initial step in addressing the potential effects of CAV on roadway capacity.

FDOT guidance,
CAV implementation in the D1RPM
Coordination with CO

CAV MODEL FEATURES:

- ***A Saturation-rate***
  - *Estimate Of How Many CAV Are "Out There"*
  - *What % Of The Vehicle Fleet / What % Of Person*
- ***A Lookup Table***
  - *How Will Roadway Capacity Change*
  - *Special-use Lanes / Queue Jumps*
- **Separate Trip Purpose**
  - *How We Identify CAV In The Moo*
  - *Cars & Trucks*
- **Special-use Lanes**
  - *How Do These Vehicles Travel*

ACES guidance (a "living document")

Answers the question of TIMING:
Current Timeframe for CAV impact on roadways