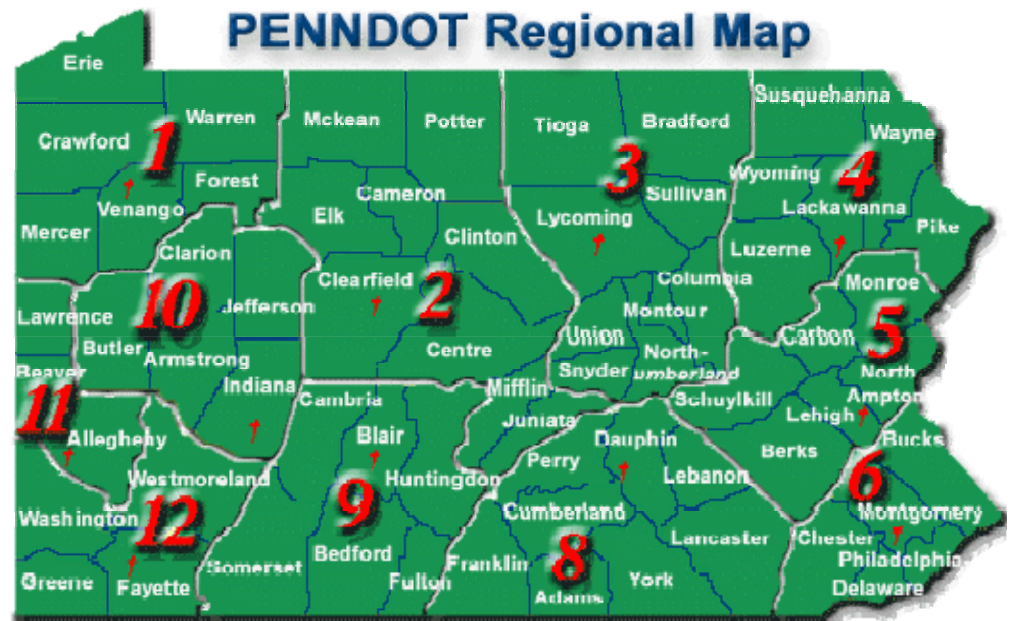


Pennsylvania Department of Transportation

- 39,700 miles of State maintained roads (5th in the nation)
- Over 25,000 State maintained bridges (3rd in the nation)
- Over \$2.5 Billion in constructions lettings last year
- Over \$1.5 Billion spent on maintenance activities last year



Automatic Vehicle Locator

Bureau of Maintenance and Operations – provides guidance and policy to district and county maintenance organizations by providing the tools (materials, equipment, training, data and reports) to monitor and improve operations.



Automatic Vehicle Locator

- AVL was attempted as an internal solution utilizing the GPS capabilities of the 800MHz radio
 - The Commonwealth's topography made the system unreliable
 - Limited infrastructure caused errors in location
 - Limited to GPS location only
 - System maintenance had to compete with other technologies for limited IT resources
 - Enhancements were difficult
 - Cost

Automatic Vehicle Locator

- 3 step process leads to AVL today
 - Step 1; Proof of Concept
 - Pilot was over 100 trucks during winter operations
 - Monitor GPS location within varying topographic areas
 - Monitor ground and air temperature
 - Receive spreader data

Automatic Vehicle Locator

- 3 step process leads to AVL today
 - Step 2; State-wide Assessment
 - Approximately 700 trucks mostly assigned to Interstates and limited access highways
 - Monitor GPS location
 - Monitor ground and air temperature
 - Receive spreader data
 - Provide location information to 511pa.com vendor for general public release on the Department's website

Automatic Vehicle Locator

- 3 step process leads to AVL today
 - Step 3; Full Implementation
 - Approximately 2,500 department force and rental trucks
 - Deploying 3 different types of units

WT2250 (GPS only)



WT10X (GPS only)



ATS (full AVL)



Automatic Vehicle Locator

- Advanced Tracking System (ATS)
 - Full AVL was preferred equipment used if compatible with spreader control software

- Transmits data over cellular signal
 - Utilizes Verizon 1G signal due to coverage availability before porting to AT&T Fleet Manager
 - Provide location information to 511pa.com vendor for general public release on the Department's website
 - Internal storage in the event cellular signal is lost
 - Installed by department force mechanics



Automatic Vehicle Locator

- Advanced Tracking System (ATS)
 - Enhanced attributes over direction and speed GPS only systems
 - Ground temperature
 - Air temperature
 - Mix (salt/anti-skid)
 - Pre-wet application
 - Spinner settings
 - Blast activation

Automatic Vehicle Locator

- Advanced Tracking System (ATS)
 - Operational benefit over direction and speed GPS only systems
 - Situational awareness of conditions (mobile mini-RWIS)
 - Situational awareness of operator's actions
 - Ability to compare in real-time; speed, conditions and treatment
 - When treating in the area of RWIS will have the treatment plan that lead to conditions reported by the RWIS site

Automatic Vehicle Locator

- WT10X

- Used when ATS is not compatible with spreader controller software or no controller is present (i.e. paint trucks and freeway service patrols)
 - Despite additional capabilities when installed with connections to the vehicle's Canbus or OBD port, only utilizing GPS location at this time
 - Transmits data over cellular signal
 - Utilizes AT&T 3G signal
 - Provide location information to 511pa.com vendor for general public release on the Department's website
 - NO internal storage in the event cellular signal is lost



Automatic Vehicle Locator

- WT2250
 - Used in seasonal rentals because of the quick nature of installation
 - Plug-and-play ease of operation
 - Transmits data over cellular signal
 - Utilizes AT&T 3G signal
 - Provide location information to 511pa.com vendor for general public release on the Department's website
 - NO internal storage in the event cellular signal is lost



Automatic Vehicle Locator

- Contract and program management
 - AT&T and Verizon
 - Both companies are on State Contract, but neither company could offer a solution that met our program goals of comprehensive cellular coverage area and a full service fleet manager program
 - Only choice was to work together to meet our program needs

Automatic Vehicle Locator

- Contract and program management
 - AT&T was selected as the AVL Fleet Manager
 - AT&T and Verizon both provide cellular bandwidth.
 - Verizon ports the data to AT&T once it is “out of the field”
 - As the AVL Fleet Manager – PennDOT is contracted with AT&T to provide AVL services
 - At this time, AT&T utilizes WebTech to provide end-user interface
 - AT&T has established an Advanced Services Help Desk to manage all aspects of the AVL Fleet Manager
 - AT&T is responsible for identifying and taking steps to correct issues with WebTech

Automatic Vehicle Locator

- Current status
 - Over 2,200 units installed by department force
 - Firmware updates available from Certified Power
 - Created a work order with 511pa vendor to add truck locations as a layer on the website
 - Developed tamper resistant marking material for terminal connections
 - Repositioned GPS antenna to reduce damage

Automatic Vehicle Locator

- Cost Savings
 - Winter route optimization in real-time – no need to follow trucks with a stopwatch
 - Reduced paperwork
 - Foreman does not need to download material data after a storm on full AVL trucks – totals available for 6 months following an event
 - Real time material usage oversight
 - Winter metrics data
 - Route based metrics
 - Limiting tort liability (paint truck)

Automatic Vehicle Locator

- Future
 - Increasing government transparency
 - Where are tax dollars making improvements today?
 - Safety
 - Alert motorists of slow moving traffic or work zones ahead
 - Message boards
 - 511 traveler information
 - Social media (i.e. Waze)

Automatic Vehicle Locator

- Contact information

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