Sharing the Sidewalk with Robots: Personal Delivery Device Technology and Policy

2:00-3:00pm ET

The webinar recording and slides will be emailed to all registrants within a day.
August 24, 2021
Michael Clamann, PhD, CHFP

UNC Highway Safety Research Center
Pedestrian and Bicycle Information Center
What is a *personal delivery device*?
Personal Delivery Device (PDD) *noun*
An electrically powered device for transporting cargo that is equipped with automated driving technology that enables the operation of the device with [or without] the remote support and supervision of a human

- Intended primarily to transport property on sidewalks and crosswalks
- Not a "vehicle"
Starship Robot

Amazon Scout

https://www.starship.xyz/
FedEx Roxo

Refraction AI Rev 1

https://refraction.ai/
Ford Digit

Nuro R2

https://nuro.ai/
Where they work
State regulation
# Personal Delivery Devices (PDDs) Legislative Tracker (Version 1.0)

<table>
<thead>
<tr>
<th></th>
<th>State</th>
<th>Bill #</th>
<th>Bill Name/title</th>
<th>Link</th>
<th>Passed?</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Virginia</td>
<td>SB 1207</td>
<td>Electric personal delivery device</td>
<td><a href="https://lis.virginia.gov/cgi-bin/billinfo.pl?Session=1...">https://lis.virginia.gov/cgi-bin/billinfo.pl?Session=1...</a></td>
<td>Yes</td>
<td>1/10</td>
</tr>
<tr>
<td>3</td>
<td>Idaho</td>
<td>HB 204</td>
<td>Relating to personal delivery devices</td>
<td><a href="https://legislature.idaho.gov/i...">https://legislature.idaho.gov/i...</a></td>
<td>Yes</td>
<td>2/23</td>
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<tr>
<td>5</td>
<td>Wisconsin</td>
<td>SB 148</td>
<td>Personal delivery devices a...</td>
<td><a href="https://docs.legis.wisconsin.gov/l...">https://docs.legis.wisconsin.gov/l...</a></td>
<td>Yes</td>
<td>3/29</td>
</tr>
<tr>
<td>8</td>
<td>Texas</td>
<td>SB 969</td>
<td>An Act relating to the operation of motorized vehicles</td>
<td><a href="https://capitol.texas.gov/t...">https://capitol.texas.gov/t...</a></td>
<td>Yes</td>
<td>2/21</td>
</tr>
<tr>
<td>9</td>
<td>Virginia</td>
<td>SB 758</td>
<td>Electric personal delivery device</td>
<td><a href="https://lis.virginia.gov/cgi...">https://lis.virginia.gov/cgi...</a></td>
<td>Yes</td>
<td>1/8</td>
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<tr>
<td>10</td>
<td>Colorado</td>
<td>SB 20-092</td>
<td>Robotic Device Deliver Cargo</td>
<td><a href="https://leg.colorado.gov/sit...">https://leg.colorado.gov/sit...</a></td>
<td>No</td>
<td>1/13</td>
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<tr>
<td>11</td>
<td>Missouri</td>
<td>HB 2290</td>
<td>Allows personal delivery device</td>
<td><a href="https://www.house.mo.gov/g...">https://www.house.mo.gov/g...</a></td>
<td>No</td>
<td>1/28</td>
</tr>
<tr>
<td>13</td>
<td>Tennessee</td>
<td>HB 2365</td>
<td>As enacted. establishes regulations</td>
<td><a href="https://www.capitol.tn.gov/o...">https://www.capitol.tn.gov/o...</a></td>
<td>Yes</td>
<td>2/4</td>
</tr>
</tbody>
</table>

32 records
Personal Delivery Device Bills (U.S.)

- Introduced (32)
- Passed (21)
Current State Legislation

- DC
# Regulatory Topics

<table>
<thead>
<tr>
<th>Physical characteristics (Speed, weight)</th>
<th>3.5-12 mph (sidewalk); 10-25 mph (shoulder); 80-1,000 lbs;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Areas of operation</td>
<td>Sidewalk, crosswalk, shoulder</td>
</tr>
<tr>
<td>Human oversight</td>
<td>“Operator is actively controlling or monitoring the navigation and operation”</td>
</tr>
<tr>
<td>Right of way</td>
<td>Similar rights to pedestrians; yield right of way to pedestrians</td>
</tr>
<tr>
<td>Hazardous materials</td>
<td>Not allowed*</td>
</tr>
<tr>
<td>Contact information</td>
<td>“A marker that clearly identifies the name and contact information...”</td>
</tr>
<tr>
<td>Insurance and liability</td>
<td>~$100,000</td>
</tr>
</tbody>
</table>
Personal Delivery Device Average Weight Limit (U.S.)
About crashes...

• Reporting and data collection?
  • Should be required
    • Track where, how many
  • Generally *not* required
    (WA, PA only)
    • False sense of safety

• How to respond?
  • Victim?
  • Law enforcement?
  • EMS?
## Comparable technologies

<table>
<thead>
<tr>
<th>Automated Guided Vehicles (AGV)</th>
<th>Personal Delivery Devices (PDD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Warehouse robots”</td>
<td>“Sidewalk robots”</td>
</tr>
<tr>
<td>Semi-structured environment</td>
<td>Unstructured environment</td>
</tr>
<tr>
<td>Trained personnel</td>
<td>General public</td>
</tr>
<tr>
<td>ANSI/ITSDF B56.5-2019; ISO 3691-4:2020 (Part 4)</td>
<td>No safety standards</td>
</tr>
</tbody>
</table>
“This is the future, and it’s sort of a shame to me that we have to bring all these things before the legislature to even start testing and making them good for the future.”
First of all, @FedEx, never get a robot to do a New Yorker’s job. We have the finest workers in the world.

Second of all, we didn’t grant permission for these to clog up our streets. If we see ANY of these bots we’ll send them packing.

See FedEx’s Package Robots Roll Through NYC Streets

New Yorkers have lots of questions about SameDay Bot. Among them: Does it also get its own street lane, and how long until NYC kills it?

🔗 patch.com
Autonomous Delivery Robots Are Now 'Pedestrians' in Pennsylvania

Look out for your future robot overlords in the crosswalk. There are now a dozen states where robots have the right to operate on public roads.

BY SEBASTIAN BLANCO  MAR 7, 2021
Different policy directions...

- Pennsylvania
  - “The Department [of Transportation] shall have general and sole regulatory authority over the operation of PDD... to ensure the safe operation...”

- Washington
  - “... May not be operated until it has been added to the list in the self-certification”

- Rhode Island
  - “PDDs must be registered with the division of motor vehicles (DMV) on a form approved by the DMV, which shall assign an identification number to each such device”

- Kansas
  - “... Shall have an audible warning system capable of detecting and warning a pedestrian for the purpose of notifying blind persons of the presence of the personal delivery device”

- Oregon
  - “Directs [a] task force to develop and make recommendations for legislation regarding operation of personal delivery devices”
Recommendations for PDD Deployments

• Develop and follow interaction standards among manufacturers
• Engage and validate with local communities before deployment
  • (Including persons with disabilities)
• Require owners to report crashes
Sharing Spaces with Robots: The Basics of Personal Delivery Devices

Source: Pedestrian and Bicycle Information Center (PBIC)

Click here to view resource

https://www.pedbikeinfo.org/PDD
or search: “PBIC resources”
Sign up for our next webinar!
Guiding the New UAS Industry to Safety Excellence
Wednesday, September 8 at 2:00pm ET

Q&A Session
Submit your questions on the right side of your screen.
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