



# Planning for a New Mobility Future

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Bill Eisele, Ph.D., P.E., PMP  
Senior Research Engineer & Mobility Division Head  
Texas A&M Transportation Institute

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# What Does the Mobility Future Look Like?



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- Probably more questions, than answers...

# (Some) “Levers” Impacting the Future Mobility Ecosystem

- The Mobility Reset
- Implications of Increased Call for Electric Vehicles
- Inequities (Among Disenfranchised Neighborhoods)
- New/Micro-Mobility
- Goods Movement (and E-commerce Rise)
- Technologies (particularly around Goods Movement)
  
- Some Final Thoughts

# The Mobility Reset (and Rethink)

- Nearly everyone rethinking (all) their travel (and their lives?)
- Where (and how) we work?
- How and where do we live and recreate (and medical, etc.)?
- How will travel patterns and modal choice change for different neighborhoods and environments (not everyone can order online and/or work from home)
  
- Bottom line - How will we travel? And when and where? And how will goods movement “follow us” with products and services?

# Increased Call for Electric Vehicles (EVs)

- Will it be the same as everyone turning on their washer and dryer at the same time every night?
- What are the implications on national and state grid networks?
- While EVs may not be emitting harmful gases or vapors – this electricity may spawn from coal, nuclear or natural gas

# Inequities of EVs

- Inequities among disenfranchised neighborhoods are perpetuated by the push for EVs
- Unable to afford the vehicles...therefore left out of the advanced safety benefits and atmospheric enhancements brought to the physical community
- We should study patterns of movement in disenfranchised cities (e.g., through mobile phone data) and focus on long-term, sustained planning contact to thwart mobility gentrification

# Inequities in Transportation

- Highway construction and displacement
- Inequitable investment in rail & bus transit systems
- Representation of suburban vs. urban within Metropolitan Planning Organization (MPO) structures
- Use of Level of Service to justify road widening
- Disproportionate investment & fund prioritization

# New/Micro-Mobility Questions

- Will it become more common to see small vehicles for short trips in dense environments; if so....
  - What impact on environment and neighborhood livability characteristics?
  - Does it take larger vehicles off the road (for convenience, goods delivery), or does it increase vehicles per household?
  - Time will tell in this realm especially as more intensive analyses of land use impacts develop in a post-COVID world

# Goods Movement: The E-commerce Growth Facts

“More than 10 years ago, e-commerce accounted for 5.1% of total U.S. retail purchases. On-line sales now account for 21% (2020), a striking jump from 16% in 2019.”

“Consumers spent \$861B on-line in the U.S. in 2020, up an incredible 44% compared with 2019. That’s the highest annual U.S. e-commerce growth in two decades.”

# ....and What about Business-to-Business (B2B) E-commerce?

“B2B e-commerce, when compared to B2C (business-to-consumer), is projected to be two times bigger than B2C in 2020. In fact, it’s anticipated to be the area of largest e-commerce growth from 2020 to 2025.”

*Source: [www.forbes.com](http://www.forbes.com)*

“B2B e-commerce sites (and e-procurement sales) grew by nearly 12% in 2020 (from 2019) to \$2.19T.” *[2.5 times B2C]*

“B2B digital sales channels – including e-procurement, electronic data interchange (EDI) and other channels in addition to e-commerce sites – increased by nearly 10% to 9.9T in 2020 from 9.1T in 2019”

# Private-sector Demands/Solutions

- Carriers (and shippers) must make their delivery windows!
- “Next-day delivery” or “same day delivery” means must get product closer to customers before they click “add to cart” and “purchase now”
  - Warehouse and/or distribution centers closer to customers
  - Inventory – how much? Where?
- More trucks to “make their turns”
- Need access to the curb
- Technological solutions



Source: <https://reporterdoor.com>

# What are the Environmental Impacts of Next-day Deliveries?

- Packaging waste (boxes, plastic wrap, etc.)
  - 165B packages shipped (~2017), “..with the cardboard used equating to more than 1B trees.”
- Meal-kits leader Blue Apron: “...sends out 8 million meals a month, each containing 2, 6-pound ice packs. The freezer pack waste is about 192,000 tons per year, or ‘the weight of nearly 100,000 cars or 2 million adult men.’”
- “A sea of packaging waste, and too much ending up in our oceans. By the year 2025, there will be a metric ton of plastic for every 3 metric tonnes of fish (UN says by 2050 there will be more plastic waste than fish).”

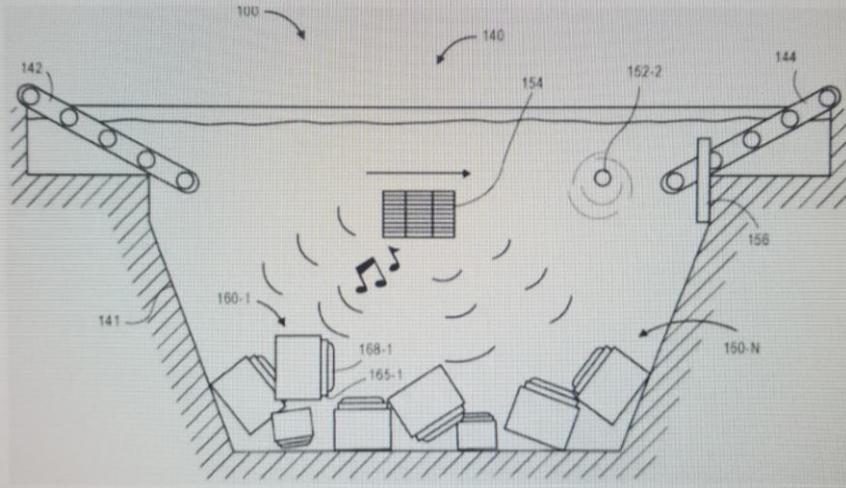
# What are (Some of) the Implications of Delivery Demands?

- Goods must arrive in perfect condition
- “Average box is dropped 17 times”
  - Large box with air bags
  - We’re shipping air
- Responsible packaging is a growing area
  - Reusable containers, etc.
- Some brands trying to get customers back into stores
- Reverse logistics
  - Returns, reselling, repairs, repackaging and recycling

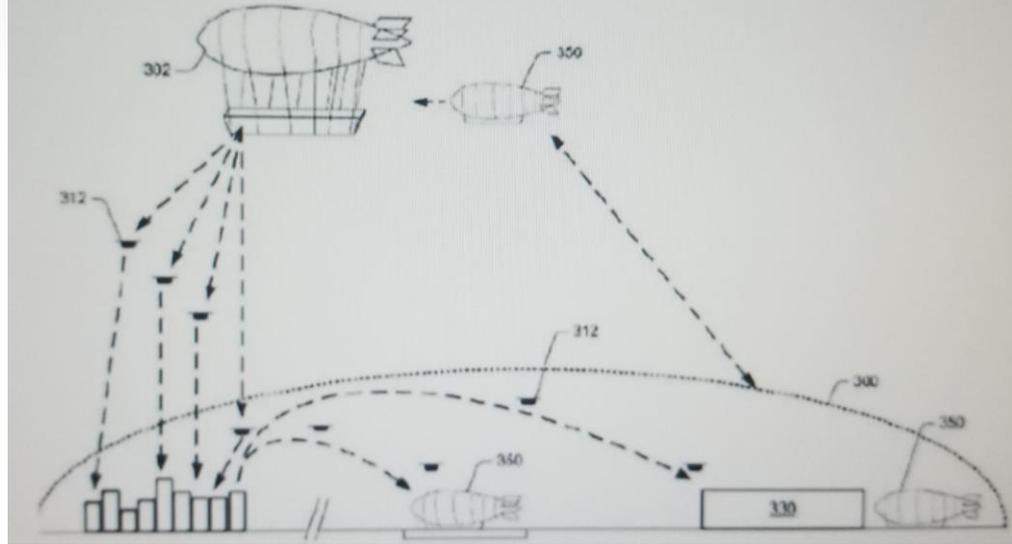
*Source: [www.forbes.com](http://www.forbes.com)  
ANAMA Package and Testing*

# A glimpse into the future?

## An underwater warehouse



## A floating airship, or a blimp

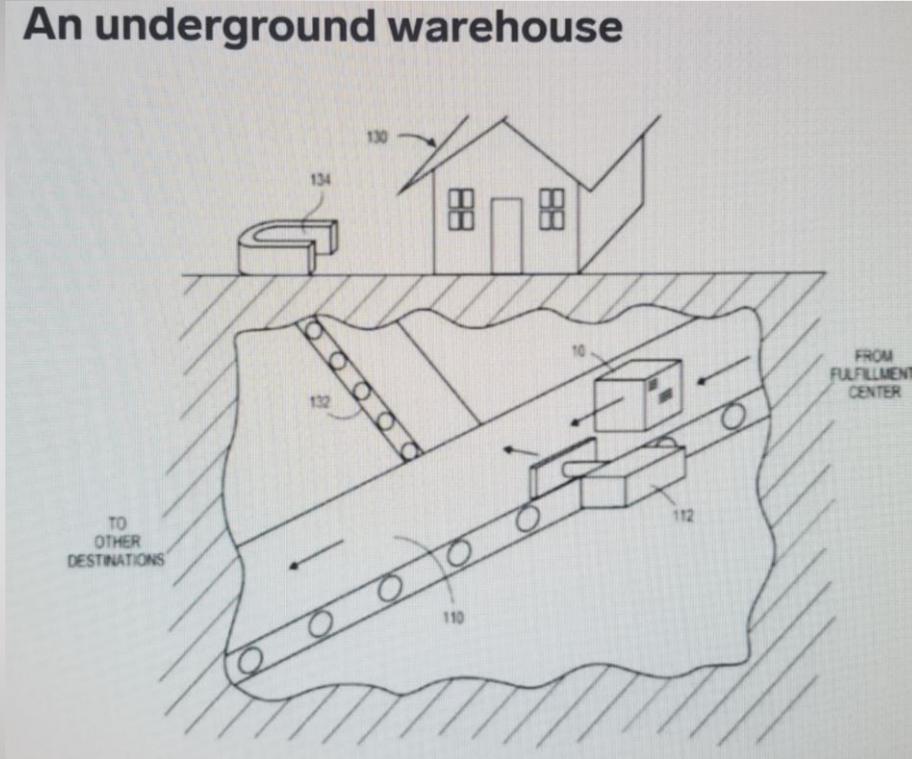


Some Amazon Patents

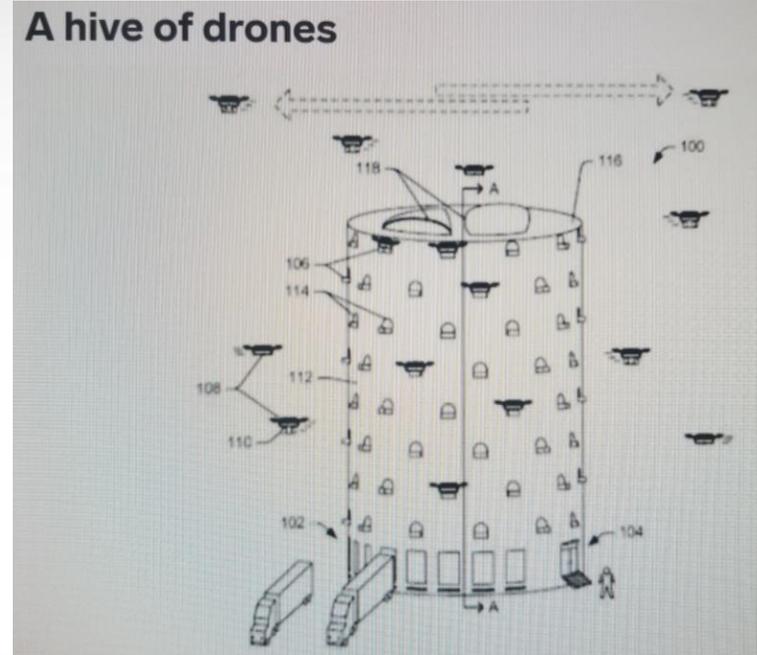
Source: [www.businessinsider.com](http://www.businessinsider.com)

# Amazon Patents – a glimpse into the future?

## An underground warehouse



## A hive of drones



“Multi-level fulfillment center for unmanned aerial vehicles”

Some Amazon Patents

# Amazon Patents – a glimpse into the future?

## An accordion-like drone chute

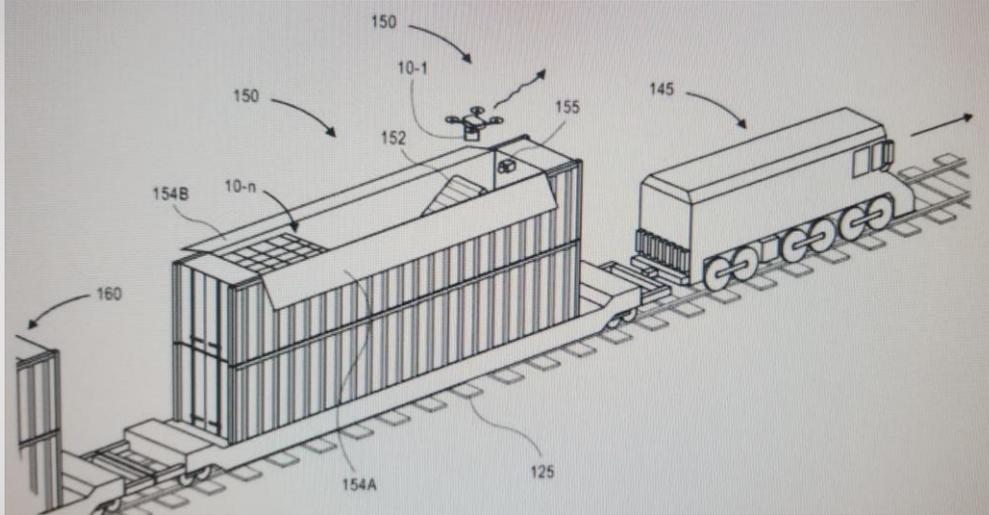


FIG. 1

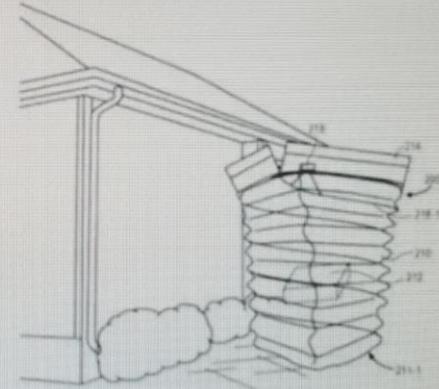


FIG. 2

# Technological Solutions are ~~Coming~~ Here

- Delivery robots
- Autonomous vehicles – implemented in freight delivery, long-haul being successfully tested too
- “Space-age” deliveries
- What about technology xx?...
- ...if it reliably and safely helps companies hit delivery windows, it will be in the running. (And this is true across the global supply chain – trucks, drones, short-haul flights, vessels, last-mile, etc.)
- *How do we equitably plan our transportation systems for this? (energy needs, maintaining a healthy environment; land use, city planning implications, building code impacts, etc.)*

# Getting to Sustainable Mobility Solutions Will Require More....

- Conversations
- Options
- Modes
- Patience
- Empathy
- Equity
- Data



# Many Stakeholders

- Several stakeholders involved (and responsible) as we (all) plan for the future
  - Public agencies (federal, state and local)
  - Private companies (businesses, shippers, carriers, technology, original equipment manufacturers (OEMs), etc.)
  - Non-profits
  - Consumers and customers (and general public)
  - .....and anyone else who ever travels, or ever eats or buys anything

# Contact Information

Bill Eisele, Ph.D., P.E., PMP, [b-eisele@tti.tamu.edu](mailto:b-eisele@tti.tamu.edu), 979-317-2461

(find me on LinkedIn)

Texas A&M Transportation Institute Mobility Division

<http://mobility.tamu.edu>

- Transportation Research Board, Urban Freight Transportation Committee
  - <http://urbanfreight.tti.tamu.edu>
  - *“Urban Freight Transportation Committee Centennial Paper: Embracing the Future with Insights from the Past”*

**Contact me....Let's continue the conversation!**