

Heaven or Hell?

*Designing the impact
of autonomous
vehicles on cities and
suburbs*

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AUTONOMOUS VEHICLES

We don't know how AV technology will roll out. Our job is to help communities envision the future they desire.

WHAT DO WE WANT THE IMPACT OF AV'S TO BE ON OUR COMMUNITIES?

WHAT KIND OF PLANNING DO WE NEED TO LEVERAGE AVS TO ACHIEVE MORE HEAVEN & LESS HELL?

Downtown Atlanta 2041: Autonomous Vehicles and A- Street Grids

Downtown's small block structure should make it the most walkable part of the city – and yet it's not. What SHOULD the A-street grid of Downtown be?

What could autonomous vehicles mean for improving walkability Downtown?

Georgia Institute of Technology
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Professor Ellen Dunham-Jones
<https://smartech.gatech.edu/handle/1853/55814>



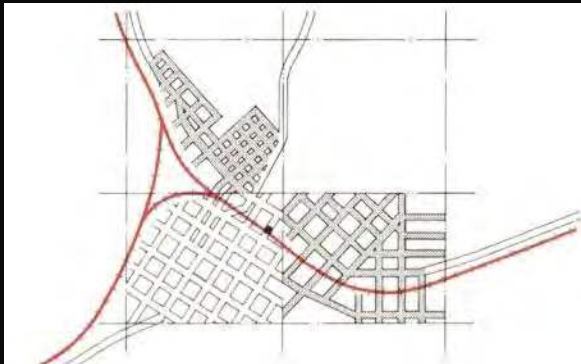
*Greater Atlanta Magazine, 1910
Illustration of Downtown in
2010....meets Google car in 2016*



EXISTING CONDITIONS

Historic-street Network

- 1821 Georgia lottery of land lots
- 1847: Atlanta is incorporated at intersection of 2 rail lines
- Early patchwork of street grids oriented to rail lines and topo. Later street grids oriented to land lots.



First three subdivisions developed by the 1850's



1853 Atlanta subdivisions map



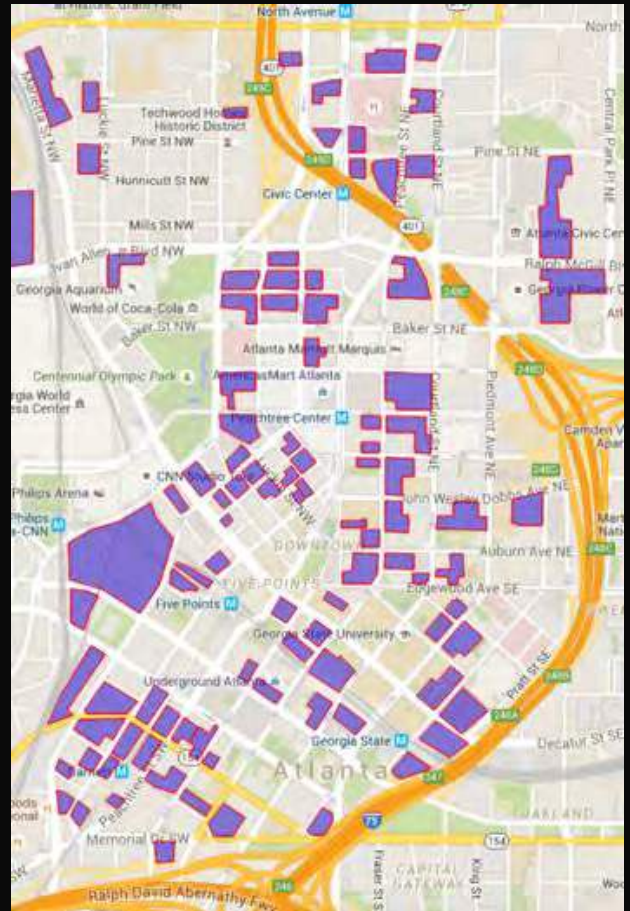
EXISTING CONDITIONS

Excessive parking

- 95,000 parking spaces
 - 62% used under “normal usage”
 - Opportunities for better event parking management?

Too few residents

- 5,500 residents in the core

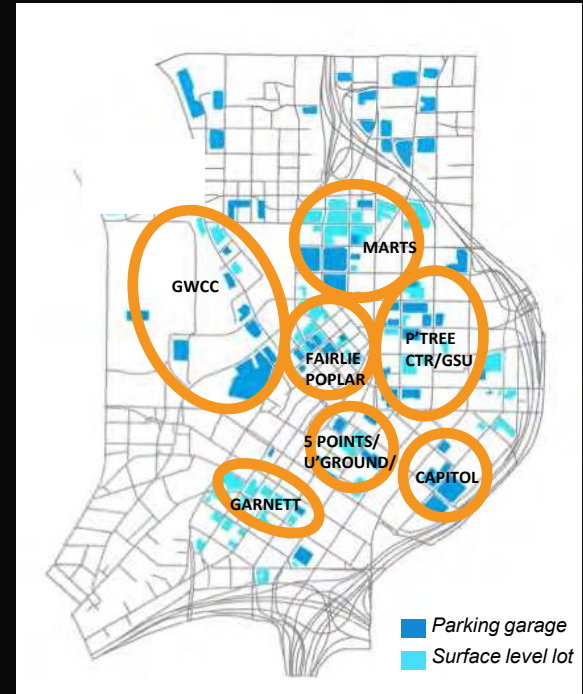




EXISTING CONDITIONS

Parking surrounds “campuses”

- Several activity nodes
- The parking surrounding each node significantly reduces walkability
- Dead zones force complexes to face in on themselves contributing to a feeling of “campusness”
- Vicious spiral: decreased walkability increases automobile dependence...





STREET NETWORK

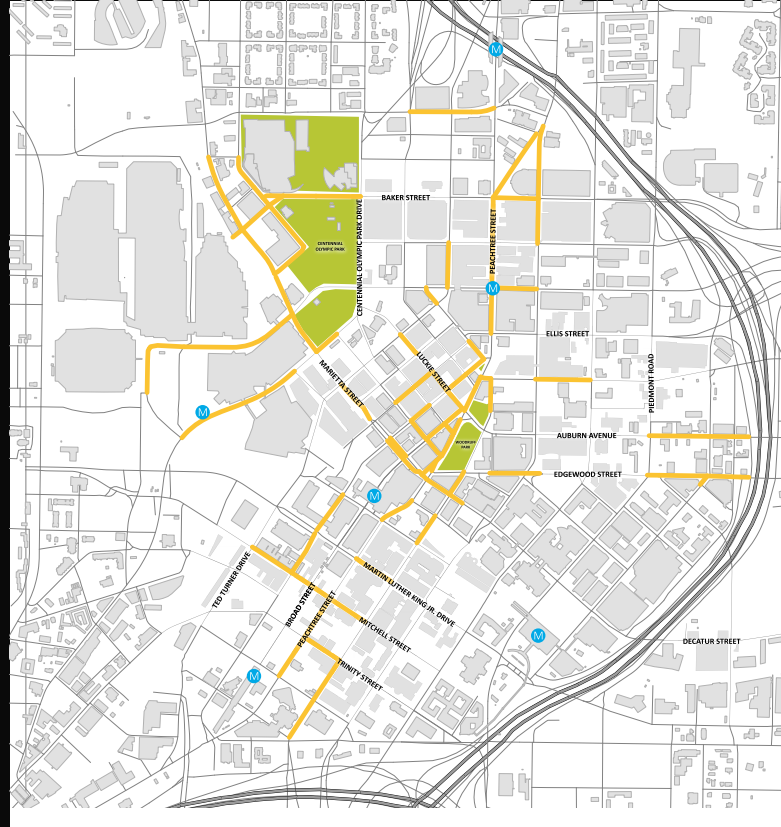
Existing A-streets inventory

- Active ground floor
- Walkability
- Spatial enclosure

Without an A-Street grid, the uses of B and C streets creep onto what should be the continuous high-quality public realm.

Unwinding the vicious spiral:

- Reduce car domination and improve walkability on A-streets
- More people on the street increases safety and the opportunity for retail to thrive, helping to attract more residents.
- More residents enables more frequent transit, more reasons to stay in or visit downtown, dampening both rush-hour and event traffic.





STREET NETWORK

A/B-street Criteria

A-streets

- Regional and Campus Connections
- Street Frontage and Existing Character
- Retail Presence or Active Ground Floors Uses
- Existing Transit
- Opportunities for Infill/Redevelopment
- History & Significance
- Supportive of an Evenly Distributed Network





AUTONOMOUS VEHICLES

The Private AV Scenario

-more sprawl

- Privately-owned car drives itself on the highway, driver takes over on local streets
- Facilitates more sprawl
- May increase congestion & VMT depending on parking
- Platooning on highways could increase lane capacity 50-100%
- Available now

The “Shared” Scenario

-more densification

- Combine autonomous shuttle bus and robotaxi
- Uber’s fleet will be driverless by 2030 with fares reduced 75%
- Expected to reduce private ownership of cars and need for parking by 40-90%
- Could augment or replace transit

The Hybrid Scenario

-more choices, less impact

- Autonomous vehicles and privately-owned driven vehicles will share the roads for a long time to come, reducing the extent of the benefits of AVs

Georgia Tech GIS Center simulation modeling shows that in Atlanta, each shared driverless car (SAV) can replace 8.9 privately-owned cars.

The difference between “heaven” and “hell” will depend on policies and designs that increase willingness to share rides



AUTONOMOUS VEHICLES

Assumptions for Downtown Atlanta 2041

The 1st Assumption

Autonomous bus will take over the proposed streetcar route, with a high-frequency dedicated lane



The 2nd Assumption

Driven cars will continue to need 50% of current parking spaces. But growth in AVs and ART will result in a 70%-90% reduction in overall parking. New buildings will not require parking.



70%-90%

The 3rd Assumption

Lane widths will shrink as shown and speed limits will not exceed 20mph in Downtown except on the highway.



Autonomous Car 8'

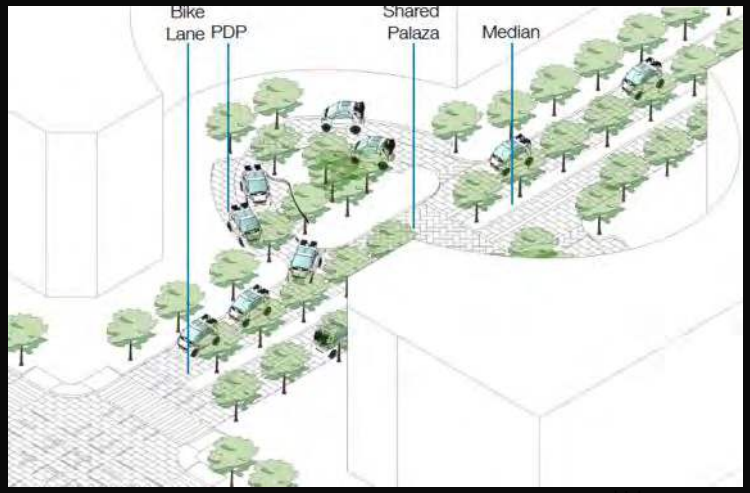
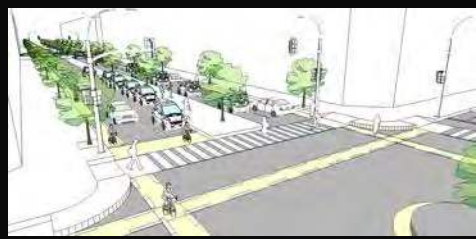
Driven Car 10'

Bike 5'



AUTONOMOUS VEHICLES

Hybrid Scenario street modifications: some lanes shared, others designated AV-only, and much replacement of on-street parking with pick-up/drop off zones



vehicle
RC: regular car
SL: shared lane

- Added capacity: 21.4M sq ft by building on 1/2 of Downtown's surface parking lots and a few aging low-rise, non-historic buildings
- If 70% of that is residential: ~60,000 new residents by 2041 without any new parking
- *Can the reduction of parking and increased walkability encourage more people to use shared AVs and transit? Maybe if we plan for it...*





Lack of new parking allows for:

- infill affordable housing, including “missing middle”
- mid-block eco-system services (water harvesting/treatment, solar, urban ag, etc.)
- The addition of narrow alleys for mid-block trash & delivery systems

Frequent autonomous bus and robotaxi allows for:

- Affordable, convenient mobility choices
- Lane width reductions & improved public realm
- Automated surveillance
- Safer, quieter, streets with wider, livelier sidewalks



AUTONOMOUS VEHICLES

Impacts on Downtown

- Safer, slower, quieter streets
- Road diets with more pedestrian space
- Reduced parking areas
- More frequent buses
- An opportunity to raise the bar on the quality and experience of Downtown Atlanta so as to attract more residents
- **A MORE WALKABLE, LIVABLE DOWNTOWN WITH A GREAT NETWORK OF CLASS A-STREETS**



Dystopic: Wall-E (2008)

Pacification of humans with food in

Hovercrafts by a big corporation

Pixar: Andrew Stanton, Jim Reardon



The future face of low tax base suburbs? Streets sold to corporations to deliver mobility, policing, and marketing for exclusive rights?

Utopic: *Future of Suburbia* (2016)

Solar suburbs, AVs, Drones, & Greenery

MIT, Center for Advanced Urbanism



Greener sprawl for the privileged to escape the city and minimize public interaction?

retrofitting challenge:

SHARED MOBILITY SUBURBIA

The keys are shared rides, public ownership of the streets and willingness to toll their use

- **SHARED MOBILITY SUBURBS**
 - Incentives for shared rides on ART & robotaxis combined w/ tolls on solo passenger rides reduce VMT and grow car-light, affordable, compact, walkable redevelopment and light industry
 - **Combat the convenience of the private AV**
 - Reduce lanes for robotaxis and private AVs
 - Give ART dedicated lanes
 - Tax solo passenger rides in robotaxis and private AVs
 - **Enhance the experience of sharing**
 - Design "better bus stops" along the ART lanes that make "waiting" a more social, productive, and enjoyable experience
 - Design community-building into mobility system & package-delivery