

Beyond Google's Cute Car

The Time to Think through
the Impact of Self-Driving
Vehicles on Architecture and
City Planning is Now

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The blogosphere has swooned over the implications of self-driving cars ever since Google released a video of its prototype in 2014. Among the many issues it raises are these: What is the future of the insurance industry? What will happen to municipalities that depend on \$6.2 billion worth of traffic citations? What of the 1.2 million annual arrests for driving under the influence? How many taxi drivers will lose their jobs? How rapidly will the 32,000 annual fatalities caused by analog cars drop?

Questions about the built environment, however, are not getting attention.





And the transformative effective of autonomous vehicles on non-antique cities—the “Houstons” of the world—will be especially profound. The debate about designing for an autonomous vehicle future needs a jumpstart: How will they shift the basic economics of land use? And what are the design implications?

Tear Down That Freeway! Long Live the Freeway!

The urgent need to think through autonomous vehicles becomes apparent if you look at the infrastructure projects currently in development.

Through my work with SWA Group and the Houston Downtown Management District, I had the opportunity to re-envision the alignment of the downtown freeway system,

and work with the Texas Department of Transportation (TxDOT) to create a new reality for downtown Houston. Generally, TxDOT’s plan is to widen freeways from eight lanes to as many as 26, but they got creative during this process. Initially, the agency proposed putting additional lanes in underground tunnels, but up above it was only looking at minimal changes to the freeway system. The same slip knot of pavement encircling the city would remain.

Our vision was to take this city bound by freeways and open it up while still meeting the intent of TxDOT’s need to move a lot of vehicles. With the stroke of a fat marker we moved I-45 and put it on top of US 59/I-69. Then we stitched Downtown and Midtown together with a beautiful boulevard where the Pierce Elevated used to be. Buffalo Bayou Park flowed seamlessly into downtown. On the east side, we would depress the new freeways and put a giant sports park on top, serving as the trail head for



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150 miles of Bayou Greenways. The freeways themselves would be viewed as public space with micro-habitat and captivating views. A city long identified by its freeways would be fittingly transformed by them.

When the traffic model for the I-45 project was developed, we were planning for the year 2035; however, autonomous vehicle use is not factored into the models. The engineers asked the question and attempted to include it, but quickly realized no one knew how; there is no software or algorithms that consider the efficiencies of the autonomous vehicle. There isn't an agreed upon standard for how to incorporate robotic cars into the model. We are designing a freeway right now that will potentially be out-of-date within the time period it is being designed for.

New Technology, Same Desires

The Audi Urban Future Initiative worked with Bjarke Ingels of BIG to carry out one of the few explorations to date with regard to what autonomous vehicles will mean for the built environment. Ingels' work suggests the 'Europeanization' of a world borne by autonomous cars. Will the rise of autonomous vehicles make us all become Europeans, buy bicycles, and spend our days in public spaces where pedestrians, cyclists, and cute little robotic cars share the same space? I doubt it. If you live in the Netherlands, sure, people already live that way. But Americans will continue to have American desires. Our post-war cities are built around a model of freeways and sprawl. This reality will intensify as autonomous vehicles take over the roads.

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I like to think of Houston as a multiverse of little walkable places. In between is all this dark matter of suburban sprawl. So we go from bubble to bubble. On a typical day, you might start off in the suburbs and go Downtown, then walk around, and get some coffee. Onward to the Medical Center, get some tests done, and walk around there. Maybe you go to Rice Village and buy some stuff or meet friends. Then to Uptown and back home. That's how Houston operates, little walkable bubbles in a vast, un-walkable void. Today, navigating the voids is dominated by unpleasant traffic jams, but distances will become less of an obstacle as our autonomous vehicles promise media saturated interiors that smoothly deliver us from walkable bubble to walkable bubble.

Autonomous Status Symbols

Everyone thinks the autonomous car of the future will look cute and small, and that we are all going to drive around in the same exact car. Beep, beep! That will not happen any more than we will all put on the same metallic jumpsuits. The future is going to be like the past. We will have different autonomous solutions for different needs. If you are an Audi guy, you will buy a subscription to Audi. When you want to go to the mountains with your family, the autonomous SUV will pick you up and take you up the slopes. If you want to go to the beach with your family, the autonomous convertible delivers you to the sand. The car will not have to park. It will pick someone

else up who also has an Audi subscription. Going to lunch in Midtown? Then maybe the cute "beep beep" car will do.

If you are wealthy, you may commute like rock stars on tour, moving around in an enormous autonomous bus fitted out with an office, shiatsu shower massage, and a treadmill for walking while riding. Maybe there is a nice bar and media room to hang out in on the way home from your downtown office. Sprawl won't matter as the drive time becomes leisure time.

If you have far less means, you will likely be picked up in something that blurs the distinction between a car and a bus. All over the Third World, from Lima to Cairo, the streets are worked by analog minivans. You can get one of these jitneys to take you practically anywhere, but once aboard, you are likely to wait for as long as it takes to fill every seat. The autonomous version in the United States will achieve higher efficiency using an Uber-like app. The METRO bus system as we know it today will change dramatically. Its subsidies will be distributed through smart phones to users of a low-cost, public-private micro-bus system.

The future may have no drivers but our vehicles will continue to be status symbols that increase the socio-economic divisions that already exist.

Connecting the Bubbles: Social Media Takes You There

Social media will take you where you want to go. Four-square users already know where their friends are, and where they are probably going for dinner tonight. Add that technology to autonomous vehicles and drivers won't even have to tell their cars where they want to go. Because the algorithm already knows what they want to do, it will get them there efficiently. Wayfinding won't be necessary. Vehicles accessing Google Maps and Waze to navigate the city don't need signs. The cacophony of big-box retail signage that dominates our frontage roads will slowly disappear as your vehicle knows exactly where to take you, and the most efficient way to get there.

What will become of those old-fashioned signs and gantry structures? I envision them repurposed for wild habitat; enormous purple martin houses and bat infrastructure, the graffiti-adorned messages to our brave new world would only be seen by the occasional self-driver.

Beyond Sprawl

With "the internet of everything," autonomous vehicles will begin to talk to each other. Each car will know exactly what the others intend to do before they do it. Autonomous



cars can travel closer together, draft off each other, and organize themselves without lanes. They just swarm the highway knowing when and what the other cars are going to do. Whether on elevated or depressed freeways, these clairvoyant vehicles will increase traffic efficiency by as much as 300 percent.

These cars don't make mistakes and they don't crash. More and more autonomous vehicles on the road mean accidents will be a thing of the past. With fewer crashes, speed limits will increase, and as these cars go faster, people will demand to go even faster. Freeways will be designed more like banked Nascar tracks permitting 200 miles per hour travel even as the total space needed decreases. As speeds increase, fewer lanes are needed and more freeway lanes will be decommissioned. Every neighborhood will demand a Highline where their freeway once stood.

The Tesla Model S can already drop you off at your front door and then go park itself. It has a software lock, but its top speed is estimated at 210 miles per hour. That means if you were in your autonomous Tesla going to The Woodlands, the commute is closer to 7 minutes, not 57 minutes. That will completely change perceptions of space, time, sprawl, and suburbia. In the future a 57-minute commute is Houston to San Antonio.

The high-speed rail envisioned from Houston to Dallas would be 90 minutes from station to station. In an autonomous vehicle, I can get door to door in the same amount of time with less hassle and no mode changes. This will pose a significant challenge to that system with many potential riders choosing to travel in the comfort of their own (or a shared) autonomously driven vehicle.

Cul-de-Sac as Walker's Paradise

What about all that dark matter between the bubbles? What will the autonomous vehicle do to the suburb and its fundamental unit of aggregation—the cul-de-sac? The safety of autonomous cars will turn cul-de-sacs into "Sunday Streets" all the time. Autonomous cars will not run over five year olds on bikes. The enforcement of autonomous-only precincts will start with suburban neighborhood associations cultivating family-friendly, "walkable" space. But what will these clusters of neighbors do with this newfound space that once was relegated to the automobile? The front yard will become the new social space that was once the domain of the suburban backyard. Garages will be transformed into modern front porches full of activities that spill out onto the public space of the new cul-de-sac. Because these spaces will be owned by no one and everyone, it's unlikely that significant investment will be made there. Instead, neighbors will pull together a mishmash of old yard furnishings, buy an above-ground pool, and decorate the space with whirligigs and do-it-yourself decks, canopies and play equipment. A true display of folk urbanism where discarded vehicular space becomes public space.

The physical structure of the cul-de-sac won't change but the structure of feeling will. Autonomous cars will make suburbs even more appealing. You can have a safe and active public realm for your kids, a space to meet neighbors, and the ability to read the e-newspaper and make cappuccinos en-route to work.



Freeway Ecology

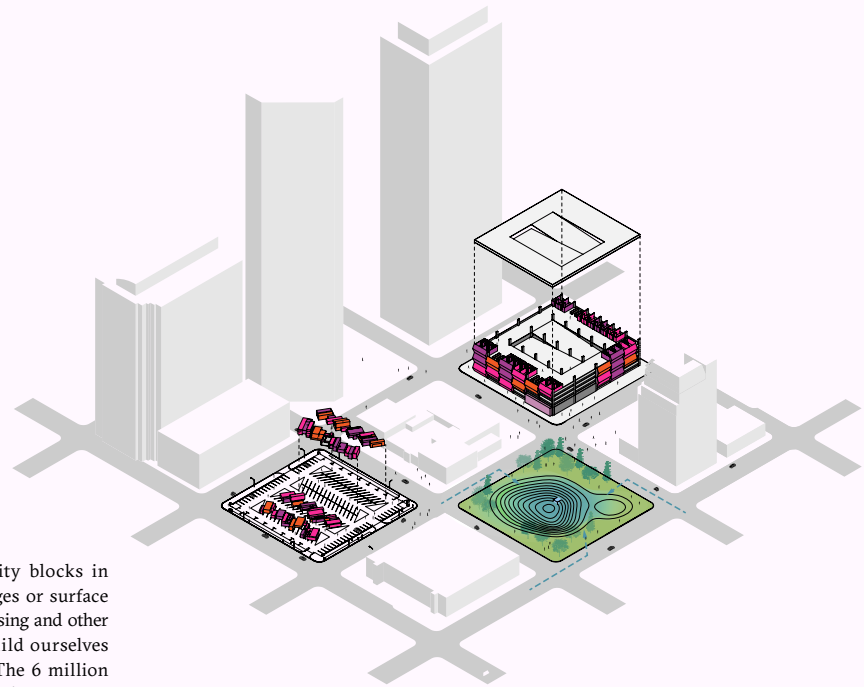
We need to figure out what are we going to do when twenty six lanes of highway become eight. All of this newfound open space can't be converted to parks. Imagine the maintenance costs of a park that stretches from Downtown Houston to Katy. Cities don't have enough money to maintain the parks that we currently have, much less build new ones of this magnitude. Instead, we'll be left with strange new natural spaces full of exotic weeds and invasive species, a habitat for bats and dragonflies—open space searching for a purpose. Do we create coyote corridors and seed dispersal zones? Will clubs with peculiar interests take ownership of portions of these spaces? The Bee Keepers Club will plant flowers and build hives; the Urban Opossum Society will tend marsupial habitat; trail runners will build footpaths and argue with the Feral Cat Guild about whose interests take precedence. A new open space aesthetic and purpose will emerge, richly green and unkempt, full of conflict and opportunity.

Parking Lots—The next cool place

After the marriage of autonomous vehicles (Google) and app-based car sharing (Uber), you will be subscribing to (Goober), not buying, cars. You will need less space to get where you are going, and no space to park the car. Even if you own your autonomous vehicle, it will move from place to place in the most efficient manner, self-park with all of the other autonomous vehicles, and require much less infrastructure. Cars that need to pick up their owners at 4 pm will all park together in tight clusters. If you use a subscription, the car may not park at all, and when it does, there will be no need for drive aisles as the next car in the queue heads off when the need arises. Some vehicles will just drive around instead of parking. The need for parking spaces could be reduced by 75 percent or more. The effect on land use will be profound. Like the decommissioned lanes of the freeway, you can't just turn all that unneeded parking into parks.

As less and less parking is needed, parking garages will need to be re-purposed.





Right now, about 25 percent of the city blocks in Downtown Houston are dominated by garages or surface parking. Some of that will be converted to housing and other uses, but we are not going to be able to build ourselves out of all of this unneeded parking space. The 6 million population in the Houston region is projected to grow to 10 million by 2050, a 165 percent increase. If Downtown living were to explode and increase by 185 percent, outgrowing its competitor districts, we would still have about 40 blocks of parking unclaimed by new development and no longer needed for parking. We must think about feral landscapes like those in Detroit and New Orleans and understand what benefits they provide to cities.

Of Houston's roughly 100,000 parking spaces Downtown, many are in garages. As less parking is needed, those structures will need to be repurposed. A ten-story parking garage may only have cars parked on the first two or three floors, what becomes of the remaining seven floors? In Atlanta, a SCAD project has converted parking stalls in a Midtown parking garage into housing. We will likely see more creative reuse of parking infrastructure. Artists invaded the industrial loft spaces of SOHO in the 1960s because these buildings had lost their purpose and were cheap or even free to live in. The SOHO loft of the future will be the abandoned parking garages where artists and new immigrants share and divide the cavernous spaces that once were dedicated to analog vehicle storage. Sloping concrete floors with oil stains and heavy beams will be all the rage, with developers ultimately building new construction to mimic the parking garage aesthetic.

This new parking reality will also change the entrepreneurial culture of Houston. The biggest barrier to entry for small entrepreneurs is often the parking requirement. As fewer parking spaces are needed, planning codes will change and many businesses will not be required to provide parking. Without the high cost of offering "free" parking

to patrons, we will see an explosion of restaurants, bars, coffee shops, and other experiential retail that Amazon Prime Now cannot deliver to your door. The ground plane of empty surface parking lots will be far more open to pop ups. Experimentation in the private realm will explode once the drag of parking is removed with new businesses opening (and closing) quickly, cheaply, and often.

Naysayers and Nostalgia

Many believe that this scenario will never happen. People used to say horseless carriages are scary. Electrical trolleys are a fad. There were races between the horse and the steam engine. The steam engine won. Car manufacturers are not debating whether these disruptions will happen, but when. You will still be able to ride a horse, and you will still be able to drive a car. But self-driving Luddites will be relegated to side roads with enormous insurance premiums. In the 1920s there was a great nostalgia for the horse and people paid a lot of money to go to a dude ranch to live the fantasy life of an earlier time. Eventually, if you have that nostalgic craving for climbing behind the wheel and pressing clutches and accelerators, you will go to the new dude ranch to live out that fantasy and drive a car yourself down a lonely track. 🐎