

Parallel Thinking: Networked Technologies for Enhanced Urbanity

Like carpet beetles, automobiles started tearing tiny holes in the fabric of our cities from their inception. Small at first, the holes got larger and then started to destroy buildings and neighborhoods. Even during the 1910s and 1920s, the period we think of as the golden era of downtowns, that balance between dense urban fabric and accommodation of the automobile was tipping (Figure 1); at first almost imperceptibly then inexorably.

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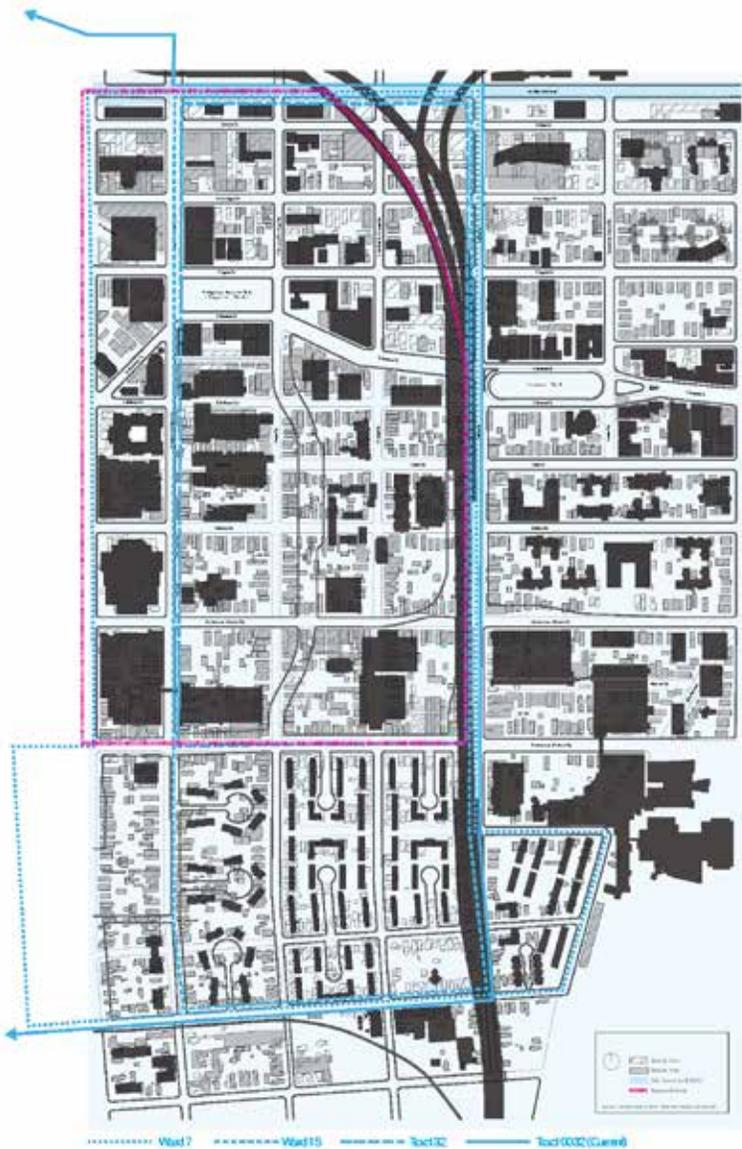
While automotive interventions were first inserted into vacant lots, or were incorporated into garages, as time went on historic structures, viable homes and older office buildings fell victim to a perceived need to warehouse more vehicles.¹

The widespread use of urban renewal accelerated downtown demolition and left more lots than buildings in its wake. Between the hollowing out of downtowns, codes mandating parking minimums and demolition of deteriorating structures (Figure 2), parking lots became the defining feature of many cities, accounting for more than 30% of the land use even though numerous studies show that cars are idle for more than 95% of the day and provisions for their warehousing for home, work and play leave oceans of empty asphalt for extended periods throughout the urban environment.²

MUNICIPAL REINVENTION

As we reach the middle of the second decade of the twenty-first-century, our cities are making a dramatic comeback. The hope even ten years ago in many cities was to mimic the less dense suburban areas in a bid to lure back shoppers, workers and residents. This did not work. Saddled with land values that remained higher than suburban areas and complicated ownership structures, the diminished urban experience did not reclaim lost shoppers or residents and declines continued. Some cities decided to further destroy parts of their downtowns in order to build suburban style shopping malls and interiorized mega developments in the hope that customers and visitors would return.³ Many of the cities that managed to thrive did so in spite of and in opposition to official plans, eschewing the reigning planning paradigms and redevelopment plans recognizing that the experience of place should win out over a government sanctioned, homogenizing car culture. Many cities were not so lucky or persistent.

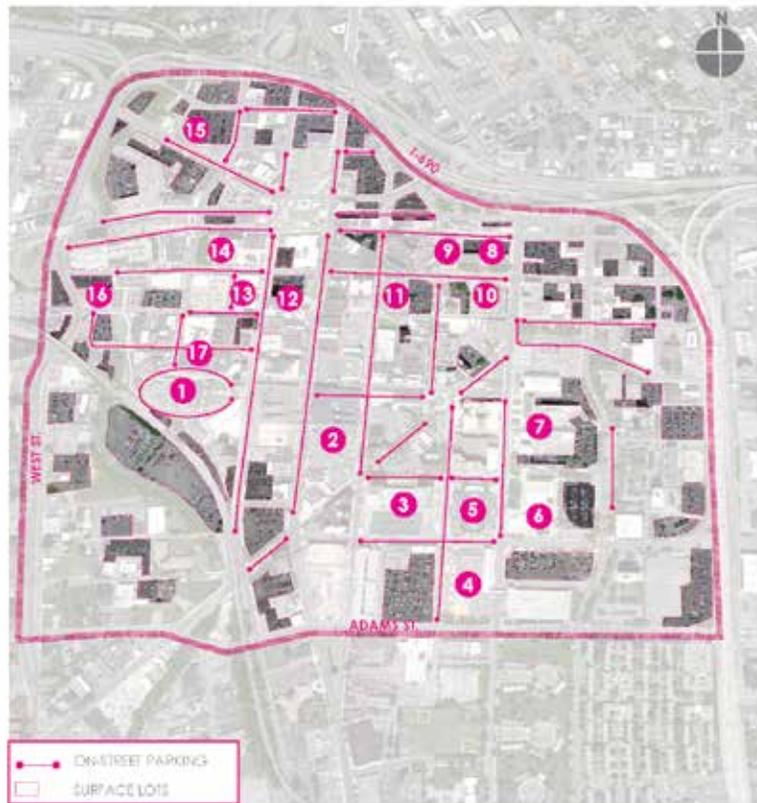
The big moves that created and continue to maintain a highly subsidized car culture, expanded federal highways as well as parking minimums, and square



footage requirements were imposed on already struggling municipalities and had their most devastating impacts in downtown cores (Figure 3).

Nevertheless, millennials are moving into former warehouses and office buildings. Businesses, realizing that new markets can be tapped are following this influx. This is not a phenomenon limited to the big, successful cities or historic districts. Markets for high rent, downtown housing, and renewed business and retail districts are thriving in cities as varied as Syracuse, Indianapolis and Salt Lake.⁴ The innovation and energy transforming our cities is mostly from the ground up emanating from individuals and at the municipal level versus top down from the federal and state governments. Bruce Katz of the Brookings Institute states, "The federal and state governments have a cartoon version of the economy, focusing on atomistic firms and workers and silver-bullet tax and regulatory solutions. Cities and metros, by contrast, blend the ecosystem and the enterprise. They focus not just on a singular transaction, firm, or solution but rather on building effective structures, institutions, intermediaries, and platforms to give dozens of entrepreneurs and firms what they need: skilled talent, strategic

Figure 1: Urban Morphology of Syracuse 1895 and 1945 Urban Morphology of Syracuse 1895 and 1945.



KEY BUILDINGS, DOWNTOWN SYRACUSE

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|------------------------------------|--|---------------------------------|
| 1- ARRIENUS OF SCHACK & TECHNOLOGY | 7- SYRACUSE CITY CLIFF & POLICE PERSONNEL DIVISION | 13- MORGAN STANLEY BUILDING |
| 2- GALLERIES OF SYRACUSE | 8- VETERANS AFFAIRS DIVISION | 14- FEDERAL BUILDING |
| 3- AXA TOWERS | 9- SYRACUSE CITY HALL | 15- VETERANS AFFAIRS DEPARTMENT |
| 4- SYRACUSE OMNICENTER | 10- VERBODEN FOS | 16- THE WAREHOUSE |
| 5- THE CHANCELLER WAR MEMORIAL | 11- KEY BANK | 17- ARMOYD SQUARE |
| 6- EVERSON MUSEUM OF ART | 12- CHASE BANK BUILDING | |

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capital, stable governance, reliable rules, functioning infrastructure, collective branding, and marketing.”⁵

With the advent of big data, we now know when the next bus will arrive, where the closest parking spot will be found and how long it will take our informal taxi to arrive. In many instances these innovations which have been pioneered in cities and have transformed how citizens engage with municipal systems and each other are opposed by the entrenched interests.⁶ New systems being developed by private corporations, hackers or innovative citizens are upending the bureaucratic processes and creating new opportunities to experience and inhabit the city. The 19th century city was a wonder which provided un-paralleled experiences and opportunities. The department stores, subway systems and the density of humanity were a unique and remarkable draw. New technologies are fueling an influx of people and capital at exponential rates and are once again making cities unique testing grounds for excitement and engagement.

With the comeback of cities many vacant lots are being filled in, office buildings are being repurposed and residents are bringing life back to the streets. As this occurs however, there is still the specter of car-centric policies, notions and expectations. Nevertheless, the clash of urban revitalization and entrenched notions that the car must always be accommodated can be overcome. This paper investigates ways in which technologies transforming our lives in a myriad of ways including car share, bike share, smart parking and software applications can

Figure 2: On-Street Parking, Surface Lots & Key Buildings.



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be deployed to invigorate our urban environments and create opportunities for increased urbanity. I will look at ways in which utilizing new technologies and rethinking and reformulating codes can provide additional momentum toward more dense, more vibrant urban environments. Technology has changed our urban lives. How can it change urban form?

SYRACUSE, NEW YORK. A CASE STUDY

While thinking broadly about creating re-densified, vibrant cities, it is valuable to provide a specific case study. Looking at Syracuse, NY, a mid-sized city that has suffered decline and disinvestment, but now has a revitalizing core, we can see a host of factors converging to create a more vibrant urban experience, but at the same time entrenched policies hindering a full and holistic revitalization. We can test these theories and speculate on the ways in which new thinking can be deployed to harness technology and dynamic systems for increased density and urbanity. In this city of 145,000 people the greater downtown area has 22,000 parking spaces in surface lots, parking structures, and on the street. 14,000 of these spots are under municipal control (Figure 4). Like many cities typical commercial development will devote 20% - 50% percent of its building lot to the warehousing of automobiles.

Investigating the current conditions of Syracuse, in an area delineated by Adams Street on the south, Interstate 690 on the North, West Street on the west and Interstate 81 on the east we can analyze ways in which the “city” allocates space and directs development (Figure 5). With rehabilitated and repurposed buildings the issue of supporting and maintaining urban fabric is moot; however as the available stock of existing buildings get developed, vacant lots, surface parking and low density structures will come to be seen as the next development sites. This is where problems arise. With each new structure, mandated parking interrupts the massing of the buildings, breaks the street wall and intrudes on sidewalk flow due to curb cuts. As additional buildings are developed these issues multiply to create a disjointed urban experience and a situation in which each building becomes an island within a sea of parking rather than adding to a growing collective whole.

The issue is laid out very clearly in Syracuse’s downtown district of Armory Square and its surrounding area. A substantial amount of investment has occurred in this area which has had a mix of new construction, rehabilitated structures from the 19th century and a commitment to streetscape

Figure 3: Garage collage.



4 THE ATRIUM GARAGE SITE IN CONTEXT

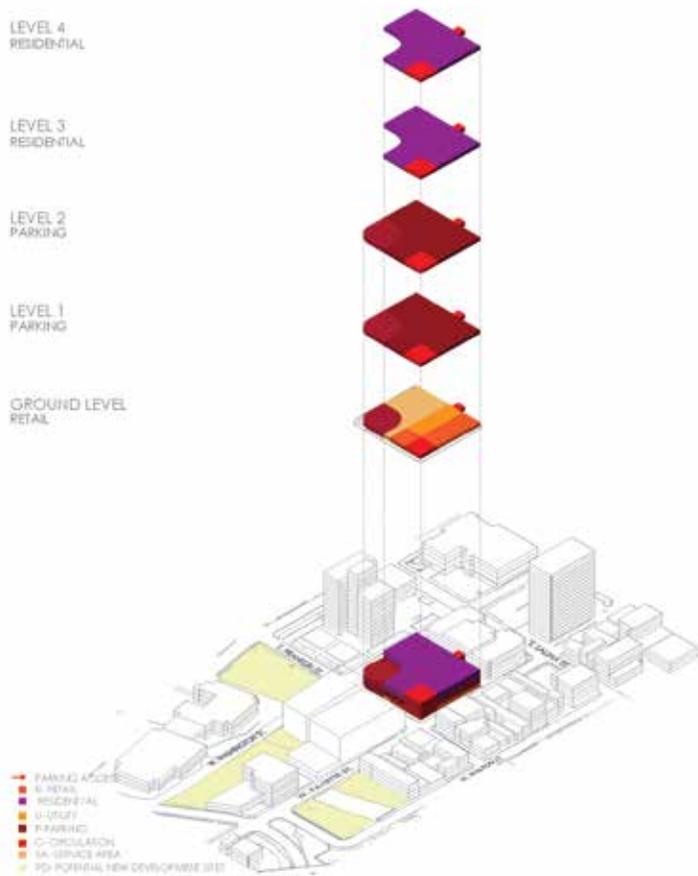
improvements and civic enhancements. Nevertheless surface parking and parking structures interrupt the streetscape. Newly constructed hotels and office buildings dedicate 1/3 to 1/2 of their site area to surface parking. With this pattern in place the thrill of new construction and renewed activity confronts a condition which foretells a quasi-suburban, disjointed streetscape as more development is pursued. The revitalized downtown will not regain the density and energy of its past.

A SIX POINT PLAN FOR RETHINKING URBAN FORM

This paper lays out a simple plan to investigate technological options through networked systems for increasing density and asserting the role of people and places over cars. The question becomes how one can utilize available technologies to mitigate the negative impacts of the car on city form. How can one use available technologies to craft a policy framework that creates twenty-first-century districts as vibrant and unique as the best cities? A methodological framework involves documentation, assessment, deployment of technological innovations, a rethinking of codes and policies then the creation of a system to cap and trade the parking lots and empty spaces that currently accompany new development. This in turn, expands the buildable square footage within the urban core which leads to increased development potential. This is not a solution for every city, but a framework for thinking about ways to reassert the role of healthy cities which promote the movement of people and the construction of vibrant places. Deploying technology to tackle these issues has implications for economic development and urban form, but also for health and well-being.

In many ways all the technologies and policies necessary for transforming our urban environments are extant. However they are disparate and not tied to an overall policy goal. The test becomes whether a concatenate of various systems and policies already in use can affect urban form. A growing number of our major cities have bike share. Various corporations and in some cases specific institutions have instituted car share. EZ pass technology is now ubiquitous on our highways and not only speeds our commutes, but also aggregates travel data. Smart phone apps like Uber and Next Bus can notify us of the nearest taxi and the next bus. Sensors can be embedded into streets and parking garages and show real time information about use and availability. These are all mechanisms which can be used to shift the preferences, regulations and subsidies to incentivize and accelerate the revitalization of central cities.

Figure 4: The Atrium Garage in Context.



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How would a holistic plan to densify and rationalize a revitalizing downtown work? I propose a six point plan:

- Calculate surface and garage space in order to create a parking district which includes on-street and off street parking.
- Use smart technology to manage demand within the district instituting dynamic congestion pricing in lieu of standard rates to produce efficiency throughout the parking district.
- Implement automatic car and bike share enrollment for improving mobility and lessening demand on parking facilities hindering better urban fabric and economic development opportunities.
- Create codes which incentivize productive uses that enhance walkability and economic development opportunities but also focus on form so as to create the possibilities for conversion from parking uses.
- Cap downtown parking and trade spaces so that the most desirable locations can reach full economic potential and promote cohesive urban environments.
- As parking demand shifts from central locations, re-purpose garages for more active and productive uses, expand the district and replicate.

Figure 5: Adaptive Reuse_The Atrium Garage.

AGGREGATING DIFFUSE SYSTEMS AND TECHNOLOGIES FOR ENHANCED URBANITY

Deploying these new technologies and incorporating them into a policy framework actually follows a pattern which has been creating efficiencies in our urban districts for the past century. In the same way that a municipal water system is more efficient than independent wells and septic tanks, or power plants trump individual generators, a parking district which can be dynamic and accommodate shifting demand throughout the cycle of the day can provide rationality, economic development opportunities, cost savings as well as opportunities for the reknitting the urban fabric. Current codes and zoning requirements create conditions which treat each building as an island, responsible for accommodating and anticipating demand for parking spaces as if they were not part of an integrated system. As part of a holistic, networked system, retailers and building owners would concentrate on their businesses and maximize rentable square footage for retail, residential or office rather than manage parking. Congestion pricing schemes could be implemented to incentivize the use of peripheral lots during the day for workers and residents leaving more spaces available during peak demand in town for shoppers and visitors. After hours prices could drop drastically for residents. Cities such as San Francisco and Chicago have deployed smart parking technology. San Francisco's system ("SFPark") uses demand-responsive pricing to open up parking spaces on each block and reduce circling and double-parking through varying rates. This system is integrated with open source technology allowing developers to create helpful apps and allowing drivers to check parking availability before leaving home and know the cost (Figure 7). These systems which are gaining traction have not been tied into other systems to achieve civic goals however. If SFPark-like systems were also integrated with car share and bike share with accompanying pricing incentives to encourage use of peripheral garages, new possibilities for valuable land currently used for parking become available. Additional benefits include enhanced transportation opportunities and promotion of exercise.

Current EZ pass technology, used primarily for road tolls could be implemented in a way that would provide seamless integration between various parking, biking and car sharing systems. This would also have the added benefit of making costs invisible. With studies from the field of behavioral economics we know that opting in to a system provides significantly less participation than opting out. Automatic enrollment in a myriad a systems from parking lots, to bike share and car share using existing EZ pass technology ensures an immediate clientele and efficient payment mechanisms.⁷

A growing number of cities have aspects of these programs each of which provide benefits that can be quantified and replicated. These programs could be of particular benefit for smaller cities and serve as differentiators, providing unique opportunities to visitors not available in more suburban settings. These systems rationalize urban mobility, but also serve as a draw. Smart Parking creates needed turnover in spaces, added revenue for cities and assurances to drivers that spaces will be available. Car share provides temporary transportation alternatives as needed and the ability to reduce car ownership and car trips within the city (Figure 10). Bike share provides quick, hassle free mobility and promotes exercise. Additionally, these new systems stream immense amounts of real time data allowing for monitoring and micro adjustments to meet shifting demands. This constant stream of data from these aggregated systems that has the possibility to change city form. Once

these systems are in place a true picture of how a city functions can be formed and manipulated to produce positive outcomes for urban connectivity. In Syracuse and many other cities with garages under municipal control integrating these systems would create an entirely new way for visitors and residents to engage with the city and a new model of mobility.

HOLISTIC APPROACHES TO RATIONALIZE PARKING SYSTEMS LEADS TO RATIONAL CODES

The first phases of the 6 point plan would create a host of benefits for municipalities looking to revitalize their downtowns, but progress would be hampered without rigorous reconsideration of current codes and regulations. In approving developments the regulations applied by cities derive from outdated notions of need as well as industry manuals which reinforce a mid-twentieth century status quo notion of city form. A look at manuals such as Architectural Graphic Standards reveals that holistic ways for promoting smart design or an enhanced civic realm as it relates to parking is virtually non-existent. The sections dealing with parking tend to focus on ways to landscape or grade lots to mitigate their negative impacts. Dolores Hayden would call this, "Putting parsley around the pig." With increasing amounts of data from successful policies and projects that break the cycle of ubiquitous uniform lots these manuals may one day address alternative uses, techniques and other ways of accommodating parking while promoting urbanity.⁸ Integrating renewed thinking into "The Institute of Transportation Engineers handbook for Trip Generation and Parking Generation" would also be a big step forward. This bible for transportation engineers does not discuss the role technology can play and mandates minimums based on a perceived peak demand even though parking is almost always oversupplied for retail spaces and office buildings. Donald Shoup, a kind of town crier for the irrationality of how cities mandate, subsidize and obsess over the provision of parking notes that 9 out of 10 workers who drive have subsidized parking, not only from their employers, but also through the tax code.⁹

Given the entrenched policies and perceptions around the provision of space for cars rather than buildings or people, data will be crucial in changing how cities and people think about current policies, re-utilization of land and promotion of vibrant centers. Once accomplished, a system whereby a central city could cap and trade parking in order to free up land for productive uses could be contemplated. Cap and trade has to date been used as an environmental policy tool that delivers results with a mandatory cap on emissions while providing polluters flexibility in how they comply. Successful cap and trade programs reward innovation, efficiency, and early action and provide strict environmental accountability without inhibiting economic growth; there is no reason we cannot think about parking in the same way.

Examples of successful cap and trade programs include the nationwide Acid Rain Program and the regional NOx Budget Trading Program in the Northeast. By studying cap and trade programs one sees immediate parallels to urban policy and the issue of parking provision. Acknowledging that automobiles and the spaces we build to warehouse them exist, but produce negative externalities cities can institute programs which reduce the negatives without inhibiting and actually enhancing economic growth.

These techniques would help to rectify what Jeff Speck labels as, "Parking induced commercial stasis."¹⁰ Creating a holistic strategy for dealing with how people

circulate and operate in our cities rebuilds the urban fabric, reduces the cost of buildings, allows for the reuse of aging structures and halts the subsidization of drivers by walkers and transit users. This strategy builds off of the policies put in place by cities like Carmel, CA which does not allow new parking in its downtown core and charges in-lieu fees to create parking on the periphery. In an integrated system tied to revamped codes this system could create the possibility of an expanded downtown with increased pedestrian activity, easy multi-modal transport and enhanced mixed use districts. Los Angeles which passed an Adaptive Reuse Ordinance (ARO) for its downtown provides a positive example of how rethinking codes drives revitalization and rational planning. Designed to encourage the conversion of vacant commercial and industrial buildings into housing, the ARO allowed developers who owned qualifying buildings to depart from the standard downtown zoning code, most specifically dropping minimum parking requirements for building conversions. Now with more than 10 years of data one can see the effects of a market determined by demand rather than unyielding codes. Michael Manville a researcher at the Lewis Center for Regional Policy Studies took this analysis further to show that housing units increased in the project area and parking spaces decreased with no discernible effect on demand.¹¹

Cities like Syracuse could learn from these cities as it looks to build on current revitalization efforts. Like many cities that suffered through post war decline its downtown's historic fabric is interspersed with multi-level parking structures. By deploying the 6 point plan, the urban renaissance under way could create a market for the conversion of its numerous multistory garages (Figure 12). While rethinking codes, city planners who have traditionally focused on the number of spaces, ingress, egress and square footage ratios should also turn to the form of parking facilities (Figure 13). Downtown revitalization to date has benefitted from the ability to convert office floor plates to residential space. Early 20th century office buildings were never intended to accommodate renewed use as residential space, but the form of these structures became appealing. Since the 1970s thousands of buildings have converted from office or warehouse use to residential and retail. Similarly parking garages with their spare concrete construction and engineering for heavy loads could also be re-used. On this score not all garages work. Parking facilities built basically as a continuously raked ramp can only be parking. Flat slabs with ramps between floors are ideal for conversion. In rethinking codes and revitalizing our cities planners should adjust codes to address how our current structures will deal with re-use. If more municipalities looked at their parking assets in this way innovative strategies for revitalization would make quick headway. By integrating the changes in code relating to both parking minimums and the form of any new parking facilities, Syracuse and many other jurisdictions could ensure that any structure, including multistory parking garages had the possibility of productive future uses.

DEPLOYING TECHNOLOGY AND ADJUSTING CODES ENHANCES ECONOMIC DEVELOPMENT

So what does a fully fleshed out system look like? It would resemble a well-designed menu with a host of choices. A driver could decide to pay little to nothing for a peripheral parking space and flow into a garage which lists available spaces on each floor along with the available amount of bikes or car hires available. As this person is in the system, a transponder charges a credit card and provides automatic enrollment in the various alternative transportation systems available on site. For someone rushed and not inclined to shifting modes, parking

is readily available for a higher price, centrally located. The price of this space would increase or decrease with demand. The trove of data received on a daily basis about how each type of consumer is using the system would be incorporated into policies for the provisioning of bicycles and car share and eventually the construction or conversion of garages.

Under this system if just 10% of the 14,000 parking spots controlled by the City of Syracuse were capped and traded more than 400,000 square feet of developable area could be made available in the urban core assuming a typical parking space of 8'x18' or 144 sq. ft. and assuming that the per space square footage is 300 sq. ft. given parking garage circulation space.

Through ordinances and form based codes jurisdictions have lessened the impact of the car to promote walkability, urbanity and increased economic development opportunities. Other systems have been put in place to promote health, multi-modal transport and efficiencies for municipal systems. Aggregating these ideas to create an integrated system could create new ways of transforming our cities.

Bike share, car share, E-Z passes and big data will not solve all of our problems, but used in a comprehensive way as a method for unlocking development potential they can heal and densify the urban core.

Syracuse and many other municipalities have the ability to implement innovative policies with respect to the parcels devoted to parking under their control. Creating the space within that framework to utilize new and developing technologies can serve to transform the urban landscape so that more and more cities can say that the retail environment, the quality of the public spaces or the streetscape are their most salient feature rather than their parking lots.

ENDNOTES

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