

Beyond the Smart City Positioning Yourself for an Unimaginable Future





Established 1913







Current Trends

- Bricks vs "Clicks Online sales
- Telemedicine.... Remote Health
- The Gigabit Economy



- Shrinking "Macro Employer" Jobs Attraction
- Economic Development via Entrepreneurialism

Transportation + Telecom Merging + <u>Emerging</u>





Mega Cities... Housing Booms Downtown -BUT -More JOBS in Suburbs **Daily Commuting REVERSING** Fatal Accidents Up 20% ADT's are DROPPING Single Family Houses < 50% WILL THIS TREND REVERSE?





What happened to my mall?

- No New Fortress Malls
- Now Urban Centers
- Residential + Retail + Recreational



12% of ALL retail is now on-line Q: What ELSE IS DYING?





The End of the Line... Say GOODBYE to:

- Road Widening Projects?
- Privately Owned Vehicles?
- Car Ownership Car Dealers?
- Parking Garages, Lots, Runoff?
- Mass Transit (Yes, \$1B Light Rails)?
- Gasoline Stations?
- Traffic Signals (Really!)
- Gas Tax (Electrification Full Adoption: 2040)?
- Three-car garages who needs to own 3 cars?
- Congestion Up AND down profound changes









Say <u>Hello</u> To:

- Electric and Autonomous Cars
- Sensors: "V2V," "V2I," "V2X"
- Roads without Traffic Signals
- 5G & Small Cell Deployment
- Smart Grid & Utility Meters
- Connectedness
- The Internet of Things (IoT)
- Fiber to the premises (FTTP)







The Future will be Mobile & Shared



The "Uberization" of the world...

ps://www.cbsnews.com/news/cities-vow-to-crack-down-on-litter-bikes





What's Driving the Change?

- **#1: People as** <u>Sensors</u> (WAZE)
- **Uber**ization & **Urban**ization
- Willingness to share data
- Explosion of data 16x from 2007
- Ubiquity of mobile devices
- Broadband: 43% ANNUAL increase in demand
- "Cross sector dynamics"
- 10 Gig Telecom Ubiquitous 5G









Autonomous – Self-Driving - Driverless



"Totally Managed Systems"





So – WHAT's the BIG DEAL?

- Congestion
 Game Changer
 - Transit 5%
 - Carpooling 5%
 - Telecommuting - 10-20%





TIME (YEARS)

Impact of Driverless Cars on Congestion

Data source: ITS International

Driverless Capacity: 300%





Has This Ever Happened Before?

- Complete Modal Transformation: 12 Years
- Infrastructure Catching up: 100 Years







Driverless Vehicle Predictions

http://www.driverless-future.com/?page_id=384



(Reference: Interstate 80 Planning Study (PEL) Automated Corridors, June 2017)





Enough to make your head spin...

And yet, we'll still have... Horses & buggies, -Oldsmobiles

Driverless Cars

All at the same time??

... Merging & Emerging









Profound Impact of Driverless Cars

- With autonomous cars
 - Send your car home instead of paying for parking!
 - Are smart cars good for **drunk** drivers ?
 - What about city **revenue drops** from no speeding tickets?
 - Might this be the end of mass transit as we know it?
- With reduced accidents
 - Is there a reduced need for ambulances, fire stations

Q: Or will DRIVING be a texting distraction?







Not Just Our Roads...

• Parking Ramps

- 50% Increase in Capacity
- Who wants to <u>pay</u> for parking when you can send your car to:
 - Run Errands via the IoT
 - <u>Park</u> itself in the <u>neighborhood</u>
 - OR Go for a joyride CLOG the FREEWAY(?)







Personal Rapid Transit (PRT)

- Driverless vehicles on a guideway
- One to four seated
 passengers plus luggage
- Direct origin to destination service – no stops
- On demand not scheduled, very short headways



Next: Spaceships? Flying Uber Taxis?





Surpise! Micro Transit for Last Mile

- Shared & Hyperlocal Solutions
 - Scooter Mania
 - Motorized
 Skateboards
 - Personal Scooters







Emerging Trends – Sensors & Dashboards

Crowd Sourcing – "WAZE" App (Google owns) PEOPLE As Sensors: Data Sources Include:

- In Pavement
- Bluetooth O & D (if discoverable)
- Wi-fi (more granular)
- Overhead / Microwave: DOT
- On-STAR (GM 12% Samples)
- Cell Phones
- Users (Citizen Tweets)

Fiber as the sensor itself





TURN

Emerging Global Trends: Big Data

Looking at Virtually <u>Everything</u> – and Looking at Everything <u>Virtually</u>

- Predicting Traffic Jams –
- Just 30 minutes in the future
- By reading <u>utility</u> meters and Private Bluetooth Devices(?)



"Big Data is the New Bacon"







Examples of real time alerts to city departments

- ✓ Stolen vehicle on a corridor
- ✓ Signal malfunction
- ✓ Abnormal vehicle congestion
- \checkmark Obstruction on the road
- ✓ Unusually large crowd
- ✓ Gunshots
- ✓ Water leak from aging pipeline
- \checkmark Carbon monoxide levels, indicating a fire
- ✓ Flood warning
- ✓ Rain event = 1 Sec "all red" on traffic Signals: reduced accidents





Action



Sensors = <u>Dashboards</u> = <u>Action</u>

- Citizens often <u>don't</u> care about City Wide Alerts
- Citizens do care about conditions that affect them...
 - Kids' school:
 - Wanting: <u>self-defined</u> warnings, data & dashboards









Emerging Trends: Smart Cities

- Interconnecting everything:
 - Signals
 - Streetlights
 - Re-purposing infrastructure
 - Bits, Bytes & Gigabits
- Transit, Utilities, Pedestrians
- The "UBERization" of our world





Finding and DEFINING our futures





Start Now - Building Tomorrow's Smart Cities

ADVANTAGES OF SMART CITY

MOBILE PAYMENTS

ONLINE ORDERING

REMOTE CONTROL

24 HOUR ACCESS

REMOTE OUTAGE

NOTIFICATION

CONTROL

WATER TREATMENT

ENVIRONMENTAL

CONSERVATION OF

CONTROL

WATER MANAGEMENT

ANIMAL POPULATIONS

UTILITY

SMART WASTE

MANAGEMENT

RECYCLING

EQUIPMENT

CONTROL

MONITORING/

REUSE

SERVICES

TRANSIT

INTELLIGENT RAIL AND TRANSIT SOLUTIONS FLEET MANAGEMENT ASSET TRACKING MOBILE PAYMENTS SMART ROADS

PUBLIC SAFETY

VIDEO SURVEILLANCE REMOTE SECURITY MONITORING EMERGENCY RESPONSE SMART STREET LIGHT

MASS NOTIFICATIONS





Telecommunications 101...





Wireless, coax, copper wires and fiber

- Coax & wire systems: ~ <u>20-40 mbps</u>
- 1 fiber strand: <u>1,000</u>+ mbps (virtually "unlimited")
 - 2003: a <u>few</u> traffic signals on one strand –
 - Now ~ <u>5,000 households</u> on <u>one</u> strand
 - 500+ Cities are now investing in broadband

Is your community tech ready?





A 5G/Small Cell Future

- 3 Miles vs 300 Feet
- A Tsunami of Small Cells
- A Tidal Wave of **Attachments**



Graphic Courtesy - American Tower





Small Cells – unmanaged & uncontrolled²⁸







Small Cells – Coordinated & Managed



Street Light Pole

Standalone Pole

Traffic Signal Pole

Hybrid Attachment

Source: "Verizon Small Cell Program", 2017 CML Conference Presentation





Regulatory Matters

- FCC 2018 Ruling
 - Creates "Shot Clock" ~ 60 days approval time
 - Limit application fees to "reasonable costs"
 - <u>Can</u> define some aesthetics
 - "<u>Can't</u> say <u>NO</u>"
 - April 15, 2019 "Soft" Deadline
- Iowa Law
 - Passed in 2018 with Similar restrictions

Is NO action a viable option?







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What Can You DO.. 5G/Small Cells?

- Conceal, Partner, Define, Manage
 - Develop Policy & Design Standards
 - Ensure Full Cost Recovery
 - Develop Internal Practices
 - Identify/Partner for Plan Review & Inspection Services









It's "Just a Streetlight" ... OR IS IT?

- Street Lighting Valuable Real Estate
 - "Smart" Streetlights
 - 5G Cellular Enabled
 - Digital Signage
 - Sensors & Counters
 - Speakers to broadcast music or announcements
 - Video streaming, change detection and traffic, parking, surveillance cameras
 - Electric vehicle charging ports
 - Visual banners
 - Environmental sensors







Smart Meters – Utility & Consumer Benefits

The data network that <u>meter</u> companies will most often recommend is a single-function <u>RF</u> <u>system.</u>

BUT – it is not the only option and may **not** be the best for:

- Longer term investments
- Smart City initiatives

STUDY:

• What role should fiber play?









What Do These Have In Common?

High speed **telecommunications** is the SINGLE common thread

- Often <u>underbuilt</u>
- Value <u>underestimated</u>
- <u>Under</u> your control
- Cities: <u>underway</u> TODAY
- Low cost, high impact
- New Revenue Streams?









Can you position for the Impact on Infrastructure?

<u>Today's</u> Infrastructure? (Highways, Light Rails, Mass Transit)? <u>New</u> infrastructure – Communication as the Fourth Utility <u>Repurposing</u> Old to New? (think: "Old" fixed route bus systems)

New intersection "Super Streets" – or... Increased Capacity = Skinny Streets?



Urban Fabric -

Traditional neighborhood design / Transit-oriented development, Might this be the end of mass transit as we know it?

Highways become "train tracks" Or – With people not driving to work, but riding to work – Q: New wave of <u>urban sprawl</u> triggered?

With reduced accidents – reduced need for ambulances, fire stations What Else – DON'T WE KNOW?





Impact On Infrastructure & Your Urban Fabric...

With the demand dropping for parking garages: Should cities stop investing in them? Can a parking garage be repurposed into, say condos or retail? Should we stop building parking garages with slanted floors and low ceilings?

Shifts in Intermodal Centers for Avs?

New neighborhood hubs – and spokes – for AV's ?

Wide driveways + streets + 3 car garages be repurposed?

The Beginning or The End of Carpooling? School Busses? Car ownership ending - "transportation as a *service*" – Cost per trip drop helping disadvantaged? Help disabled and elderly people with mobility?

Can you get a ticket for drinking – and <u>not</u> driving your AV?







If SMART is inevitable... Where do I start?

- **FIBER** = the common thread
- Lacking Today
- Under Your Control
- You Can Do TODAY
- <u>Low</u> Cost, High Impact



Create & Manage the Fourth Utility





Step #1: Update Your Public Policies

- Develop fiber friendly policies
- Develop co-location program
- Consider street light municipalization
- Review your street cut program
 - Create revenue recovery systems
 - End city subsidization of street cutters
 - Apply revenues to new program
- Update your management systems -
 - New underground requirements
 - <u>Every</u> inch of <u>every</u> utility should be mapped in
 3D in your GIS at <u>no</u> expense to the city
 - Small Cell Regulations = #1 PRIORITY!







Step #2: Share Your Fiber

- **Identify** fiber-related **assets**:
 - GIS layers, records, conduits, strands, agreements, splice points, vaults, etc.
 - Look for abandoned infrastructure
 - Identify underutilized capacity
 - AGAIN: DEFINE OWNERSHIP OF <u>EVERYTHING</u> IN ROW
- Identify community partners and seek <u>mutual</u> benefit
- Leverage Federal/Local grant programs





Step #3: Create & Implement Long Term Strategies

- Facilitate private sector competition and consumer choice
- Explore making some public assets available to private sector
- Encourage internet-based economic development, job creation, new business start-ups and entrepreneurs
- Encourage the private sector to invest
- Create Partnerships with the private sector
- Facilitate access in public places
- Monetize access to connectivity assets





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Final Thoughts – Did we cover everything?

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The FUTURE is – Not what it "used to be" **PS** - It arrives tomorrow! Q: How's your schedule?



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QUESTIONS?



