WHERE COMMUNITY AND SPIRIT MEET

SPECIAL ANNOUNCEMENT REGARDING CITY COUNCIL MEETINGS

Under Section 610.015 of the Mo. Sunshine Law provides that members of the City Council who are not physically in the Council Chambers can participate and vote on all matters when an emergency exists and the nature of the emergency is stated in the minutes.

The U.S., and the world, is in a state of emergency due to the Coronavirus—Covid-19. The Missouri Governor and the County Executive directed all citizens to limit meetings and gatherings to a few people to avoid the spread of the Coronavirus. Therefore, members of the City Council have elected to participate in this meeting electronically so that we are compliance with such Orders and for the public health and safety of each other and the general public.

The first portion of the January 7, 2021 work session agenda is an open session and Zoom information for the public to follow along is listed below. The second portion of the work session is closed session and it not open to the public. The Mayor and Council will end the Zoom meeting for the open session and will go directly into the closed session.

To follow along with the open session of the work session of the City Council work session via Zoom please see instructions below:

You are invited to a Zoom webinar.
When: Jan 7, 2021 05:30 PM Central Time (US and Canada)
Topic: January 7, 2021 City Council Work Session - Open Session

Please click the link below to join the webinar:
https://us02web.zoom.us/j/84739001623

Or to Join by Telephone:
Dial: +1 301 715 8592 or +1 312 626 6799
Enter Webinar ID: 847 3900 1623

If you are unable to join the webinar the meeting will be live-streamed on the following platforms:

Facebook: www.facebook.com/cityofkirkwoodmo
YouTube: www.YouTube.com/kirkwoodcitymo
Twitter: @KirkwoodCity

*****SEE THE FOLLOWING PAGES FOR THE AGENDA***

Kirkwood City Council Work Session
Agenda
via Zoom
Thursday, January 7, 2021, 5:30 p.m.
(Posted January 5, 2021)

The first portion of the January 7, 2021 work session agenda is an open session and Zoom information for the public to follow along is listed below. The second portion of the work session is closed session and it not open to the public. The Mayor and Council will end the Zoom meeting for the open session and will go directly into the closed session.

(Please note that work sessions are for council discussion only and there will be no public comment portion of the meeting. The time for each of the topics are estimates. When a topic is completed the council will immediately move on to the next item on the agenda.)

I. Approval of the December 10, 2020 Work Session Minutes

II. Approval of the December 17, 2020 Work Session Minutes

III. Parking Sensors (5:30 p.m.)

IV. Motion to close the meeting pursuant to RSMo Chapter 610.021 (1 – Legal)

V. Motion to open the meeting

VI. Meeting Adjournment

Kirkwood City Council: Mayor Tim Griffin; Council Members Maggie Duwe, Liz Gibbons, Bob Sears, Wallace Ward, Kara Wurtz, and Mark Zimmer

Contact Information: For full City Council contact information visit www.kirkwoodmo.org/council. To contact the City Clerk call 314-822-5802. To contact the Chief Administrative Officer call 314-822-5803.

Accommodation: The City of Kirkwood is interested in effective communication for all persons. Persons requiring an accommodation to attend and participate in the meeting should contact the City Clerk at 314-822-5802 at least 48 hours before the meeting. With advance notice of seven calendar days, the City of Kirkwood will provide interpreter services at public meetings for languages other than English and for the hearing impaired. Upon request, the minutes from this meeting can be made available in an alternate format, such as CD by calling 314-822-5802.

WHERE COMMUNITY AND SPIRIT MEET®

WORK SESSION MINUTES

A work session of the Kirkwood City Council was held via Zoom Virtual meeting on December 10, 2020, at 4:30 p.m. Present were Mayor Griffin, Council Members Duwe, Gibbons, Sears, Ward, Wurtz, and Zimmer. Also in attendance were Chief Administrative Officer Russell Hawes, Assistant Chief Administrative Officer Georgia Ragland, City Clerk Laurie Asche, Public Services Director Bill Bensing, Public Services Planning and Development Services Director Jonathan Raiche, City Planner II Amy Lowry, Public Information Officer Freddy Doss, and City Attorney John Hessel.

ANNOUNCEMENTS FROM CITY ATTORNEY

City Attorney John Hessel stated for the record that under Section 610.015 of the Mo. Sunshine Law provides that members of the City Council who are not physically in the Council Chambers can participate and vote on all matters when an emergency exists and the nature of the emergency is stated in the minutes.

So, let the minutes reflect that the U.S., and the world, is in a state of emergency due to the Coronavirus—Covid 19. The Missouri Governor and the County Executive directed all citizens to limit meetings and gatherings to a few people to avoid the spread of the Coronavirus. Therefore, members of the City Council have elected to participate in this meeting electronically so that we are compliance with such Orders and for the public health and safety of each other and the general public.

APPROVAL OF DECEMBER 3, 2020 WORK SESSION MINUTES

Motion was made by Council Member Zimmer and seconded by Council Member Ward to approve the December 3, 2020 work session minutes. The motion was unanimously approved.

DISCUSSION OF ZONING CODE AMENDMENTS

Mayor Griffin announced that Council held a Public Hearing in February 2020, prior to the COVID-19 pandemic beginning for the Zoning Code Amendments. This item along with others had been delayed with plans of having in-person meetings and discussions. Inquiry was made as to when or if the Zoning Code Amendments item would be taken up again.

City Attorney John Hessel stated Council, legally, has an obligation to act upon the recommendations from the Planning and Zoning Commission, although the Council does not have to consider all of the amendments in one move.

Mayor Griffin proposed that Council begin reviewing the Zoning Code Amendments again, leaving the higher profile items (B-2 Building Height, Floor Area Ratio and Residential Setbacks) to address at a different time.

Planning and Development Services Director Jonathan Raiche updated Council on the Kirkwood By Design proposal:

The City Council was scheduled to vote on the Kirkwood By Design proposal in March; however, these votes have been delayed due to the COVID-19 pandemic. Staff strongly believes that the Kirkwood By Design process which spanned approximately 12 months, until it was delayed, should be revived at this time. The process included multiple opportunities for public input through open-houses, online surveys, and formal

public hearings. The process was led by a 6 member Steering Committee that consisted of 3 City Council members and 3 Planning & Zoning Commissioners who dedicated countless hours to reviewing the details of the code and providing direction to Staff and the City's consultant team to prepare the draft code. The code re-write project includes numerous changes that will provide more efficient review processes, updated regulations, and a code that is better aligned with the long-range vision that the City has created in its recent planning efforts.

The recommendations of the Steering Committee established for the City's comprehensive rewrite of various development regulations were presented to the Planning & Zoning Commission on January 8th and 29th. As a result of those meetings, the P&Z Commission passed various amendments to the draft code dated December 18, 2019. A copy of the draft was provided to the Mayor and City Council serving at that time. The City Council held a special public hearing on February 27, 2020. Staff provided the Mayor and City Council with a memo summarizing the various amendments to the draft code dated December 18, 2019 that were recommended by the Planning & Zoning Commission.

At this time, Staff is requesting that Council consider reviving this project to provide the City with the updated development regulations that will better serve the Community. Since the public hearing, Staff has heard various concerns from Council members and Staff has identified additional recommendations for consideration.

There are three categories of potential amendments to be reviewed:

- Incorporating Text Amendments already approved since February 27, 2020
- Additional Staff Recommendations
- City Council Initiated Recommendations to allow further discussion

Staff has also recommended to amend section 25-3, Effective Date, providing a delayed effective date. Some of the topics discussed are as follows:

- The goal of the Steering Committee is to improve the quality of life by looking at the codes and to help the community
- It was suggested to revert back to the existing codes on Floor Area Ratio (FAR), B-2 height and residential set back
- Inquiry was made regulating foundation height
- Mention was made to use Vision Zero and Complete Streets to help determine where bike racks are required
- This process has engaged the public more through the website, open houses and public hearings and it was suggested to push the future meetings on social media to make the public aware
- It was mentioned the memo referencing "Revert residential setbacks to current code" in the R-4 and R-5 Districts is meant to incrementally provide the reduction in set back at 13% for all districts with a minimum of 5 foot
- Mayor Griffin mentioned keeping the current codes in place at this time to avoid any further confusion on the matter and to have continued discussions before placing this item on an agenda

It was the consensus of Council to begin discussions again on the Zoning Code Amendment project leaving the higher profile items to address at a later time.

There being no further matters to come before the council, the meeting was adjourned.

Laurie Asche, CMC/MRCC
City Clerk

WHERE COMMUNITY AND SPIRIT MEET®

WORK SESSION MINUTES

A work session of the Kirkwood City Council was held via Zoom Virtual meeting on December 17, 2020, at 5:45 p.m. Present were Mayor Griffin, Council Members Duwe, Gibbons, Sears, Ward, Wurtz, and Zimmer. Also in attendance were Chief Administrative Officer Russell Hawes, Assistant Chief Administrative Officer Georgia Ragland, City Clerk Laurie Asche, Deputy City Clerk Kim Sansegraw, Public Information Officer Freddy Doss, and City Attorney John Hessel.

ANNOUNCEMENTS FROM CITY ATTORNEY

City Attorney John Hessel stated for the record that under Section 610.015 of the Mo. Sunshine Law provides that members of the City Council who are not physically in the Council Chambers can participate and vote on all matters when an emergency exists and the nature of the emergency is stated in the minutes.

So, let the minutes reflect that the U.S., and the world, is in a state of emergency due to the Coronavirus—Covid 19. The Missouri Governor and the County Executive directed all citizens to limit meetings and gatherings to a few people to avoid the spread of the Coronavirus. Therefore, members of the City Council have elected to participate in this meeting electronically so that we are compliance with such Orders and for the public health and safety of each other and the general public.

MOTION TO CLOSE THE MEETING

Motion was made by Council Member Zimmer and seconded by Council Member Duwe to close the meeting pursuant to RSMo Chapter 610.021 (3 – Personnel) & (1 – Approval of Closed Session Minutes).

Roll Call Vote as Follows:

Mayor Griffin	“Yes”
Council Member Sears	“Yes”
Council Member Duwe	“Yes”
Council Member Zimmer	“Yes”
Council Member Ward	“Yes”
Council Member Wurtz	“Yes”
Council Member Gibbons	“Yes”

The meeting was closed.

MOTION TO OPEN THE MEETING

Motion was made by Council Member Ward and seconded by Council Member Duwe to open the meeting.

Roll Call Vote as Follows:

Mayor Griffin	“Yes”
Council Member Sears	“Yes”
Council Member Duwe	“Yes”
Council Member Zimmer	“Yes”
Council Member Ward	“Yes”
Council Member Wurtz	“Yes”
Council Member Gibbons	“Yes”

The meeting was opened.

APPROVAL OF DECEMBER 10, 2020 WORK SESSION MINUTES

Mayor Griffin announced the December 10, 2020 Work Session Minutes will be brought up at the January 7, 2021 Work Session.

PARKING SENSORS

Chief Administrative Officer Russ Hawes introduced Matt Willenbrink from Fybr to discuss installing parking sensors in the Special Business District as a demonstration project in the St. Louis area. Some of the cities that are currently using the Fybr Parking Sensors include San Francisco, CA, Washington, D.C., and Columbus, OH.

Fybr specializes in networks of parking sensors which assists drivers find parking spaces. The Fybr Parking Sensor is an intelligent edge device that provides accurate, real-time detection for every space. Parking data is monitored 24/7, captured by Fybr Parking Sensors, and broadcast using a radio network.

Some of the advantages to using the Fybr Smart Parking Platform are as follows:

- Reduced congestion for drivers
- Drivers can conserve fuel
- Increased revenue for cities
- Diminish pollution
- Enliven community

The sensors can collect information when a vehicle pulls into a parking space and relay it to the gateways then back through the network within 1-2 seconds. Drivers can use the wayfinding application – Parking Genius to find spaces near their destination, see the cost to park and pay for parking.

The deployment is for one year, which at that time the City could continue to have the project for $16,000 per year. Fybr will provide the following at no cost to the City:

- Up to 275 parking sensors
- Gateways
- All hardware installation
- Full access to real-time analytics
- White-labeled consumer wayfinding mobile application
- Directed enforcement mobile application

The sensors can detect when vehicles are violating parking regulations by how long a vehicle has been in a space, potentially finding abandoned vehicles. Some of the items discussed are as follows:

- Benefits include being able to see open parking spaces before leaving their home and the City having a real-time parking study at all times
- No cost for installation
- If the street gets resurfaced, Fybr would pull the sensors and re-install them after resurfacing
- Wayfinding signs can be tied into the Fybr network
- A study in San Francisco showed no raise in parking rates, raise in parking revenues and compliance went up
- No personal information is collected on any person or vehicle by the parking sensors

Discussion will continue at a future Work Session.

There being no further matters to come before the council, the meeting was adjourned.

_____

Laurie Asche, CMC/MRCC
City Clerk

fybr®

People. Places. Connected.

Kirkwood Smart Parking

November 6, 2020

ABOUT US

WE HELP CITIES MAKE THEIR RESIDENTS AND VISITORS HAPPIER, OPTIMIZE OPERATIONS, AND MAKE BETTER DECISIONS.

For more than 20 years, Fybr has been a leader in the smart parking industry. Our story began in 1998 when our primary focus was on smart parking technology. Since then, we have successfully deployed numerous large-scale parking installations; skillfully navigated the challenges of urban environments; maximized battery life; perfected our accuracy; and delivered numerous cost effective solutions for making communities more efficient—all while maintaining a highly-secure platform.

Simply put, smart parking is in our DNA.

But we didn't stop with parking. Fybr transitioned to the broader IoT space in 2012 and we now offer a robust Smart City solution that includes not only parking but intelligent lighting, air quality, environmental, water monitoring, and more.

In multiple large-scale deployments, we have consistently demonstrated that our system can successfully tackle the challenges communities face while enabling a fast path to ROI for a wide range of Smart City and IoT projects.

Fybr is based in Chesterfield, MO and designs, engineers, and directly oversees manufacturing of all Fybr products in the United States. All products are tested by a certified ISO 9001 : 2015 manufacturer.

15	6	37	63
ISSUED US PATENTS	PENDING US PATENTS	ISSUED FOREIGN PATENTS	PENDING FOREIGN PATENTS

Fybr currently holds 15 issued U.S. patents, six pending U.S. patent applications, and 100+ foreign granted or pending patents covering a wide range of technologies in the Smart City and Intelligent Parking verticals.

PROVEN AT SCALE

FYBR CONSISTENTLY DELIVERS ACCURATE, RELIABLE, REAL-TIME DATA ACROSS THOUSANDS OF DEVICES IN SOME OF THE HARSHEST URBAN ENVIRONMENTS.

Fybr has proven the reliability of its platform in places like Washington D.C, San Francisco, Montreal, and Dallas; in university campuses like Texas A&M; and in truck rest stops along U.S. Highways.

Additionally, San Mateo County (Silicon Valley) has chosen Fybr as the platform for their smart cities laboratory due to the extensibility of the platform—offering the ability to "future proof" IoT solutions to the greatest possible extent.

Deploying a network of tens of thousands of geographically distributed, ultra-low-power, wireless devices in a complex urban environment can present many real-world challenges. But we have used these situations to learn and make our system even better.

Operating in Montreal's -27°C winters, we learned how to maintain battery reliability and efficiency in extremely frigid weather conditions.

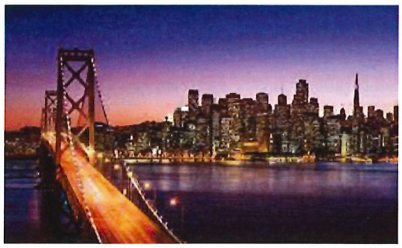
Operating in radio-noise-prone Washington, D.C. and electromagnetic-interference-prone San Francisco, we perfected reliable, efficient, low-latency, and secure delivery of messages to and from devices in harsh, evolving urban settings.

Rapidly iterating with our customers in these early deployments, the Fybr Platform is highly tuned for safe, reliable and power efficient over-the-air updates to firmware, configuration and algorithms operating in the low-power edge of the network.

For high security, we've implemented best practices, secure network protocols, anomaly detection algorithms, and tightly controlled processes into our system that carefully manage the entire life cycle of devices and their keys from manufacturing to recycling and enable a reliable, encrypted—yet power efficient—network.

Installing tens of thousands of devices while navigating city permits and permissions, our field teams have highly optimized installation, configuration, and testing processes. For example, installing Fybr's parking sensors in roadbeds takes a team of three people less than five minutes per sensor.

EXPERIENCE



SAN FRANCISCO, CA : SFPARK

2011–2014 | PARKING | $5,150,000

Federally funded through the Department of Transportation's Urban Partnership Program, SFpark was a parking pilot that sought to use innovative technology to test a new approach to manage parking in San Francisco. With Fybr's help, the city was able to collect and utilize real-time data to identify parking availability and implement demand-responsive pricing to help make parking easier to find.

WASHINGTON D.C. : PARKDC

2016–present | PARKING | $217,000

The District Department of Transportation's ParkDC pilot successfully implemented a cost-effective, data-driven approach to managing on-street parking in two of the District's busiest neighborhoods. The deployment of Fybr's parking sensors was successfully combined with a range of data sources, including transactions, historical occupancy, and citations to produce real-time availability information and inform pricing algorithms. Due to the success of the pilot, DDOT is currently working to expand demand-based parking pricing to other District neighborhoods.

SAN MATEO COUNTY : SMC LABS

2018–present | PARKING + IOT | $70,468

San Mateo County Labs is using Fybr's end-to-end, integrated IoT platform to pilot several use cases, including parking, irrigation management, air quality monitoring, and asset management. Part of this deployment is focused on providing citizens with real-time parking availability for EV charging stations in order to address "recharge anxiety"—the reluctance of drivers to use their electric vehicles because of fear they may not be able to find an open charging station.

COLUMBUS, OHIO

2019–present | PARKING | $10,000

Fybr was selected as a finalist for a 90-day evaluation that began in October 2019 and ran through December 31, 2019. As part of the trial, Fybr installed 114 sensors and provided API integration with the city's existing systems. After a rigorous evaluation and a three-month trial, Fybr's Smart Parking Solution was selected over its competitors to provide real-time occupancy data of on-street parking information in the vibrant, Short North Arts District. Fybr completed the expansion of the project in May 2020.

SEATTLE, WASHINGTON

Summer of 2020–present | PARKING / CURBSIDE MGMT | $151,000

Fybr was awarded the contract to deploy a DOE-funded project to evaluate activity in loading zones in the city of Seattle. Fybr deployed a curbside management system to monitor vehicle occupancy in 39 passenger and 37 commercial vehicle loading zones, as well as two alleyways frequently used by delivery vehicles. Installation was completed in September of 2020, and the system is being evaluated through the end of 2021.

REFERENCES

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OVER 11,000 PARKING SENSORS

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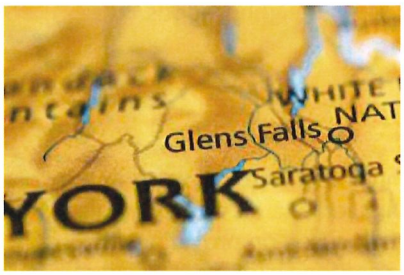

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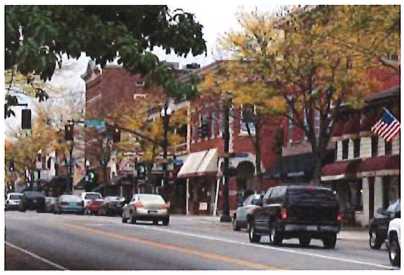

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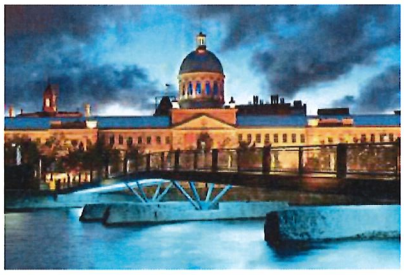

Montreal, Québec, Canada
ACCURATE PARKING DATA IN HARSH WINTER CLIMATE

Charles Auger
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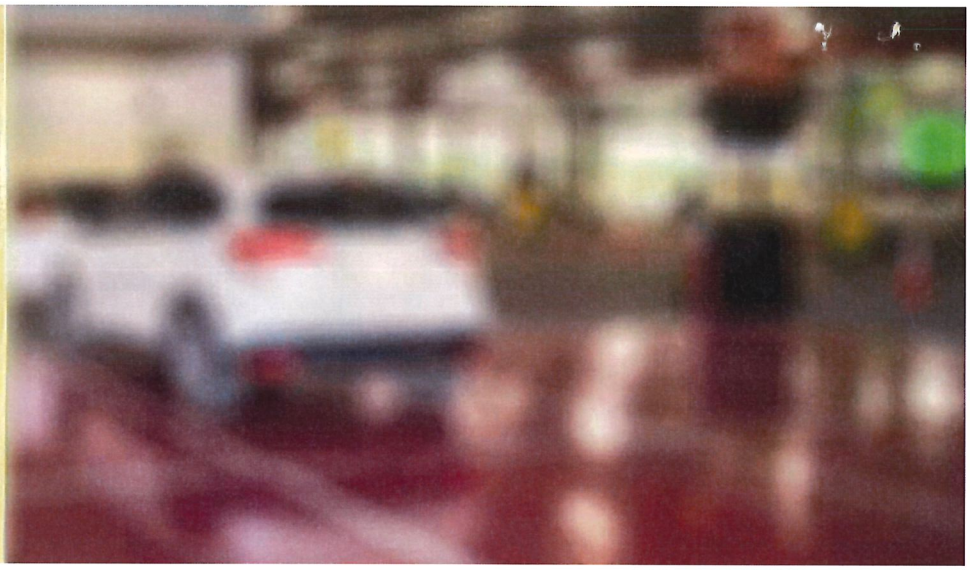
THE FYBR
PARKING PLATFORM
reduce congestion
conserve fuel
increase revenue
diminish pollution
enliven community



THE FYBR PARKING PLATFORM

OUR REAL-TIME DATA ALLOW COMMUNITIES TO MAKE PROACTIVE AND INFORMED DECISIONS.

HIGHLY SECURE, REAL-TIME DATA

Fybr's Parking Platform is an end-to-end IoT solution that safely and securely delivers real-time data that can be analyzed for trends by location, time of day, season, etc.—allowing for development of advanced parking policies and procedures.

This provides communities with the best and fastest opportunity to create a return on investment and remain vibrant, productive and inviting places to live.

THE BEST PARKING SENSORS AVAILABLE TODAY

Fybr's patented, highly accurate, in-ground sensors outperform competitors and are the cornerstone of the Fybr Parking Platform.

Equipped with a highly accurate magnetometer, our parking sensors can accurately detect vehicles without concern for many of the factors that plague other sensor types—including weather, color, and ambient light.

This modality allows us to create a maximum battery life of 7-10 years in the smallest form factor possible.

FLEXIBLE SOLUTIONS FOR ON-STREET AND GARAGE PARKING

Fybr offers multiple solutions that can easily and accurately collect real-time parking data from all spaces. Unlike other systems, Fybr combines technologies to collect data in garages, on garage rooftops, in surface lots, and in on-street parking spaces.

Fybr's parking platform also allows communities to display parking availability on digital signage at points of entry or at critical driving decision points. With a wide range of sizes, colors, and display options available, we can provide a sign that fits your information and aesthetic needs.

A COMPLETE PARKING PACKAGE

Our parking and curbside management solution includes sensors, a highly secure network, real-time data, mobile/web applications, enterprise data management, and third-party integration.

MAXIMIZING THE VALUE OF EVERY SPACE.

THERE ARE NUMEROUS BENEFITS OF PLACING A SENSOR IN EVERY PARKING SPOT.

Space occupancy/availability information can be delivered to drivers via our wayfinding app—allowing them to more easily find open spaces with turn-by-turn directions. The app can also notify drivers of options like garages and parking lots that they may have been unaware of.

Even if drivers don't have the app, parking availability can be served up via digital signage providing real-time garage and lot data.

Parking time limits can more easily be enforced, even in areas without meters, with the electronic chalking capabilities of our *Enforce* app. Enforcement also becomes more fair and efficient due to the officer's access to real-time occupancy data (and payment data if applicable).

The real-time occupancy of on-street, surface lot, and garage parking spaces can be monitored and data can be analyzed by space, block, or even the entire city with *Fybr Insights*. Having access to real-time and historical data allows cities to create more effective plans for high demand situations and incorporate dynamic pricing models to help balance overall parking inventory utilization.

By effectively managing time limits in free parking areas, congestion can be reduced while improving turnover—creating economic value for local shops and businesses.

Sensors placed in other special use spaces—such as no parking zones, fire zones, in front of fire hydrants, and handicapped spaces—can all benefit from real-time data, immediately alerting city officials of potential safety concerns.

Also, as local deliveries, autonomous vehicles, and ride-sharing services become more prevalent, managing curbside spaces will become a critical component in a community's parking policies. By placing sensors in these zones, city officials can more effectively enforce policies while gaining a better understanding of how the zones are being utilized.

fybr

PARKING = THE FAST TRACK TO ROI

IN A VAST MAJORITY OF COMMUNITIES, PARKING IS AN UNDER-LEVERAGED SOURCE OF FUNDS.

The average city only collects about 60% of the maximum possible parking revenue from each meter, and typically captures less than 7% of violations.

With the Fybr Smart Parking Solution, that lost revenue can easily be regained. A reasonable expenditure in the short-term can rapidly cover the initial investment and become a reliable, fully-utilized source of revenue.

At 43 cents per space per day, our system is very affordable and can quickly pay for itself. Most communities see ROI in as little as 12-18 months.

The incremental revenue that is generated from parking can then be used to expand other Smart City efforts without the need for new capital.

The "soft" benefits of a better managed parking inventory include higher space turnover which increases the revenue of local businesses and leads to additional sales tax revenue—a win for both businesses and cities.

Below are several revenue models that use information from Kirkwood's Downtown Master Plan and Parking study. We have made a few assumptions based on our experience in other other cities with similar size, feel, and parking infrastructure and policies.

VIOLATION REVENUE ONLY

	Model 1	Model 2	Model 3	Model 4
Total Number of Spaces	2212	2212	2212	2212
Average Ticket Price (blended rate)	$20	$20	$20	$25
Daily Violations Per Space	0.5	0.5	0.5	0.5
Total Daily Violations	1106	1106	1106	1106
Average Violation Capture Rate	2%	5%	8%	8%
Daily Violations Captured (ticketed)	22.12	55.3	88.48	88.48
Projected Annual Ticket Revenue	**$161,476.00**	**$403,690.00**	**$645,904.00**	**$807,380.00**
TOTAL ANNUAL REVENUE	**$161,476.00**	**$403,690.00**	**$645,904.00**	**$807,380.00**

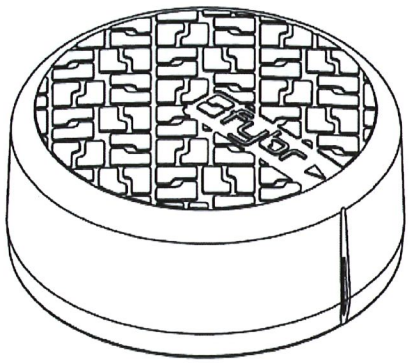
VIOLATION + PAID PARKING REVENUE

	Model 5	Model 6	Model 7	Model 8
Total Number of Spaces	2212	2212	2212	2212
Average Ticket Price (blended rate)	$20	$20	$20	$20
Daily Violations Per Space	0.5	0.5	0.5	0.5
Total Daily Violations	1106	1106	1106	1106
Average Violation Capture Rate	5%	5%	5%	5%
Daily Violations Captured (ticketed)	55.3	55.3	55.3	55.3
Projected Annual Ticket Revenue	**$403,690.00**	**$403,690.00**	**$403,690.00**	**$403,690.00**
Number of Paid Parking Spaces	53*	500	500	1000
Hours of Paid Parking (daily)	10	10	10	10
Average Occupancy	25%	50%	50%	50%
Average Hourly Parking Rate	$0.50	$0.50	$1.00	$1.00
Annual Paid Parking Days (Mon-Sat)	302	302	302	302
Annual Meter Revenue	**$20,007.50**	**$377,500.00**	**$755,000.00**	**$1,510,000.00**
TOTAL ANNUAL REVENUE	**$423,697.50**	**$781,190.00**	**$1,158,690.00**	**$1,913,690.00**

* = the number of parking spaces in the lot (with pay station) next to Kaldi's

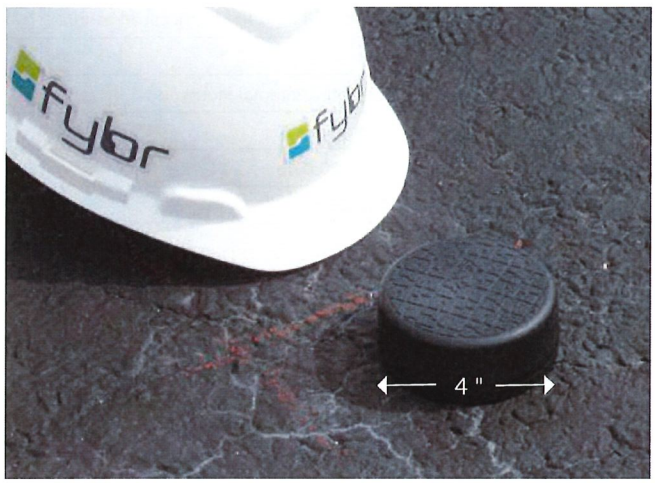
fybr

THE FYBR PARKING SENSOR



The Fybr Parking Sensor is an intelligent edge device that provides accurate, real-time detection for every space, is designed for years of low-maintenance service, and adaptable to a wide range of installations.

In addition to a state-of-the-art MEMS magnetometer that senses vehicles, each device has a microprocessor, a proprietary 900-MHz radio, and a long-life lithium battery.



Fybr's parking sensor shown before it is core drilled into pavement.

These powerful components are enclosed in a durable, weatherproof plastic housing that's not much larger than a regulation hockey puck, measuring just 4-inches in diameter and 1.6-inches high.

Parking data is monitored 24/7, captured by Fybr Parking Sensors, and broadcast using a proprietary 900-MHz radio network. This communication protocol ensures reliable delivery of real-time information to our suite of mobile and desktop tools which serve up alerts and meaningful insights to drivers, parking managers and field technicians—improving parking oversight and experiences overall.

Features:

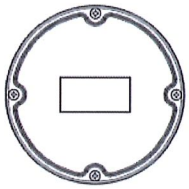
- Recessed or surface mounting enables easy, virtually invisible installation in a variety of locations: paved streets, multi-level structures and more.
- Surface mount housings can be glued or bolted to the pavement in areas where drilling isn't feasible.
- Easy recessed installation in 10 minutes with no saw cuts; use a hammer or core drill to create a hole 4 in/10 cm in diameter and a max of 6.5 in (16.5 cm) deep.
- Automatic self-calibration adjusts each sensor to local and magnetic changes that occur over time for optimal, continuous accuracy.
- Custom configuration for reliable accuracy in areas where sensing is normally challenging due to frequent trains, buried or overhead services and more.
- Remote firmware upgrades executed with wirelessly delivered data patches to optimize speed and minimize use of battery power.
- Failsafe data relays with message confirmation and automatic switchover to alternate gateways when needed.

A Fybr technician core drilling into a parking lot for a recessed sensor installation that will be flush with the surface and virtually invisible.

- Sleep and wake modes reserve power using it only when sensing vehicles or sending/receiving network data.
- Long-lasting lithium battery provides power for up to 10 years with average power use for sensing and sending/receiving data.
- Compatible hardware pairs seamlessly with Fybr's end-to-end platform and can also be integrated with other systems/components.
- Rugged industrial design from the inside out, with technology and housing designed for performance in extreme conditions.

THE FYBR PARKING SENSOR *(continued)*

Top view



Bottom view

Physical Specifications

power source	non-replaceable primary Li-SOCl2 3.6v battery pack
dimensions	3.9" x 1.68" (9.9 cm x 4.27 cm)
weight	• 11.5oz / 327g (surface mount) • 21.7oz / 616g (embedded)
mounting types	• in-pavement mounting: adhesive • in-pavement mounting: removable housing • surface mount
operating temperatures	-55°C to +85°C

Functional Specifications

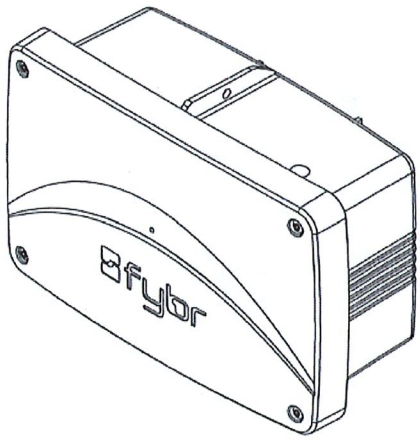
detection type	• 3-axis magnetic field sensing • temperature • accelerometer
sampling rate	10/100 Hz
programmable parameters	• sampling interval • gateway group • magnetometer thresholds • max RF power • health & welfare reporting interval
modulation	• LoRa direct sequence spread spectrum
frequency band	902 to 928 MHz (ISM unlicensed band)
RF channels	25
antenna type	integrated, internal mounted
antenna field of view	hemispherical
output power	max. +20 dBm
receive sensitivity	-113 dBm

Compliance

FCC: This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

IC: This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

THE FYBR GATEWAY



The Fybr Gateway is a compact, microprocessor-controlled device that creates a bridge between a wide range of edge devices and the Fybr Engine—providing rugged, reliable communications for real-world environments.

Data from Fybr-enabled edge devices travel through our gateways to the Internet, where it is processed and delivered as useful insights to users—from drivers to managers to technicians. Gateways use a proprietary 900-MHz radio protocol for two-way data exchange with sensors, while internet connections are handled by a choice of cellular modem, wifi, or ethernet.

Fybr Gateways offer multiple power options, all with battery backup: 120/240 volt line power, external solar panel or power over ethernet, and internal USB/ expansion ports for additional modules. Additionally, all Fybr Gateways feature state-of-the-art 360° coverage, built-in fault detection, and a compact form factor that is aesthetically pleasing in a wide range of environments.

Features:

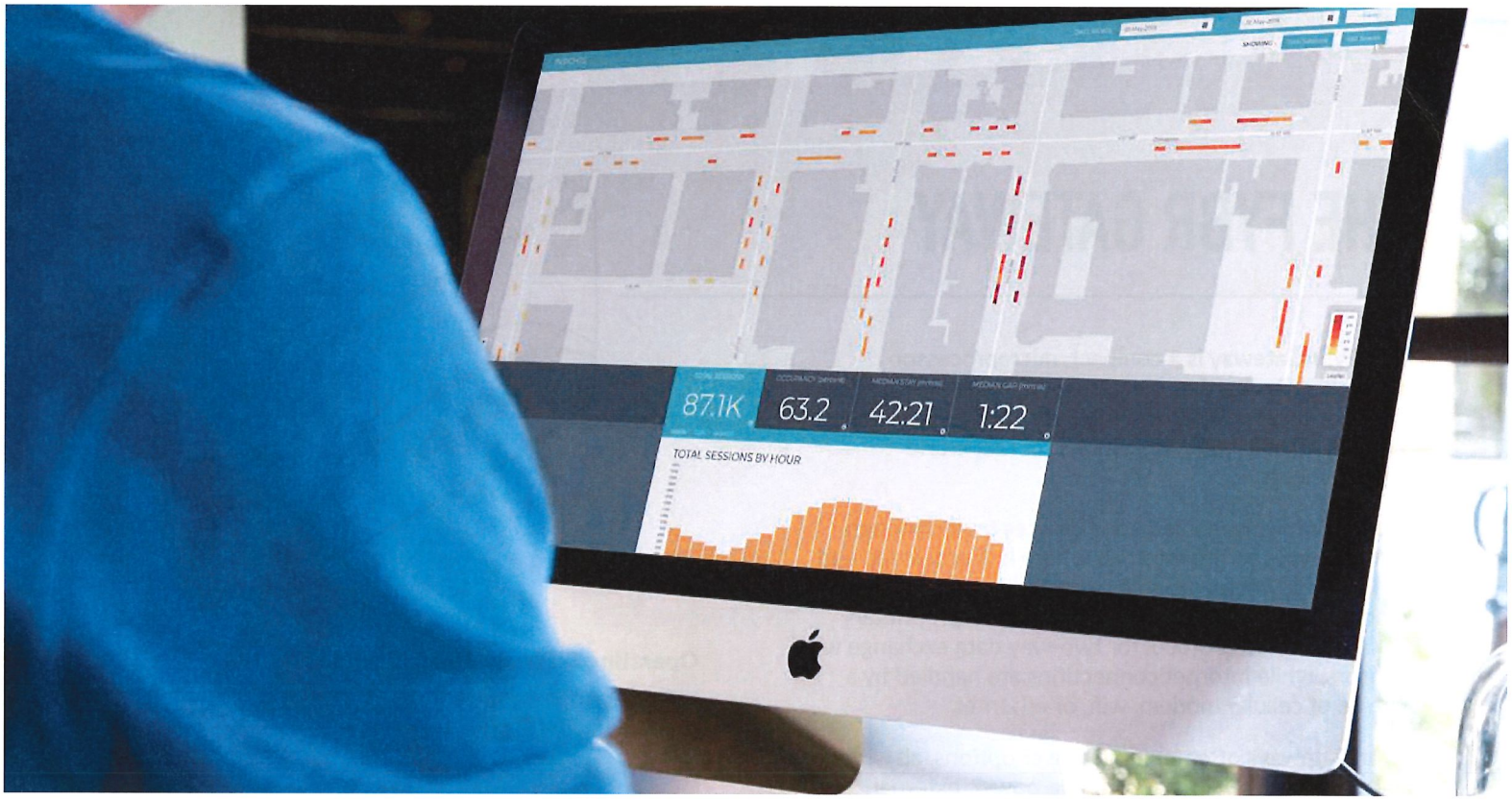
- Infrastructure-free power options to accommodate virtually any installation location. All gateways are battery powered with the option for externally mounted solar panels to extend life where permitted.
- Dual radio allows secure communication for proprietary smart city and infrastructure devices, while simultaneously supporting LoRaWAN devices for non-critical city functions.
- Auxiliary battery power provided by an 11.1-volt battery pack keeps communications up and running reliably and without power interruptions.
- Internal expansion ports allow for the addition of new technology and functionality over time, without installation of new devices.
- Battery fault detection ensures sensor data is rerouted to alternate devices when necessary, and alerts technicians of service needs.
- Remote firmware upgrades executed with wirelessly delivered data patches optimize speed and minimize use of battery power.
- Failsafe data relays with message confirmation and automatic switchover to alternate gateways when needed.
- Compatible hardware pairs seamlessly with Fybr's end-to-end platform and can also be integrated with other systems/components.
- Rugged industrial design from the inside out with technology and housing designed for performance in extreme conditions.

Operating & Physical Specifications

power source	line, solar, or POE + battery backup
backup power	serviceable 11.1v low temp Li-ion battery
standby power duration	up to 6 days
dimensions	11" x 6.5" x 4.5" (27.9 cm x 16.5 cm x 11.4 cm)
weight	2.3lbs / 1.1kg
mounting	universal mouting hardware
operating temperatures	-40°C to +85°C

Functional Specifications

modulation	LoRa™
frequency band	• 915 MHz ISM (North America) • 868 MHz ISM (EU)
frequency channels	25
antenna type	externally mounted patch antenna (omni or directional)
output power	max. +20 dBm
receive sensitivity	-106 dBm
network connectivity	cellular, wifi, ethernet
cellular connectivity	CDMA, 3G,4G, LTE, other



FYBR INSIGHTS

FOR ANALYTICS AND MONITORING OF YOUR ENTIRE PARKING PLATFORM.

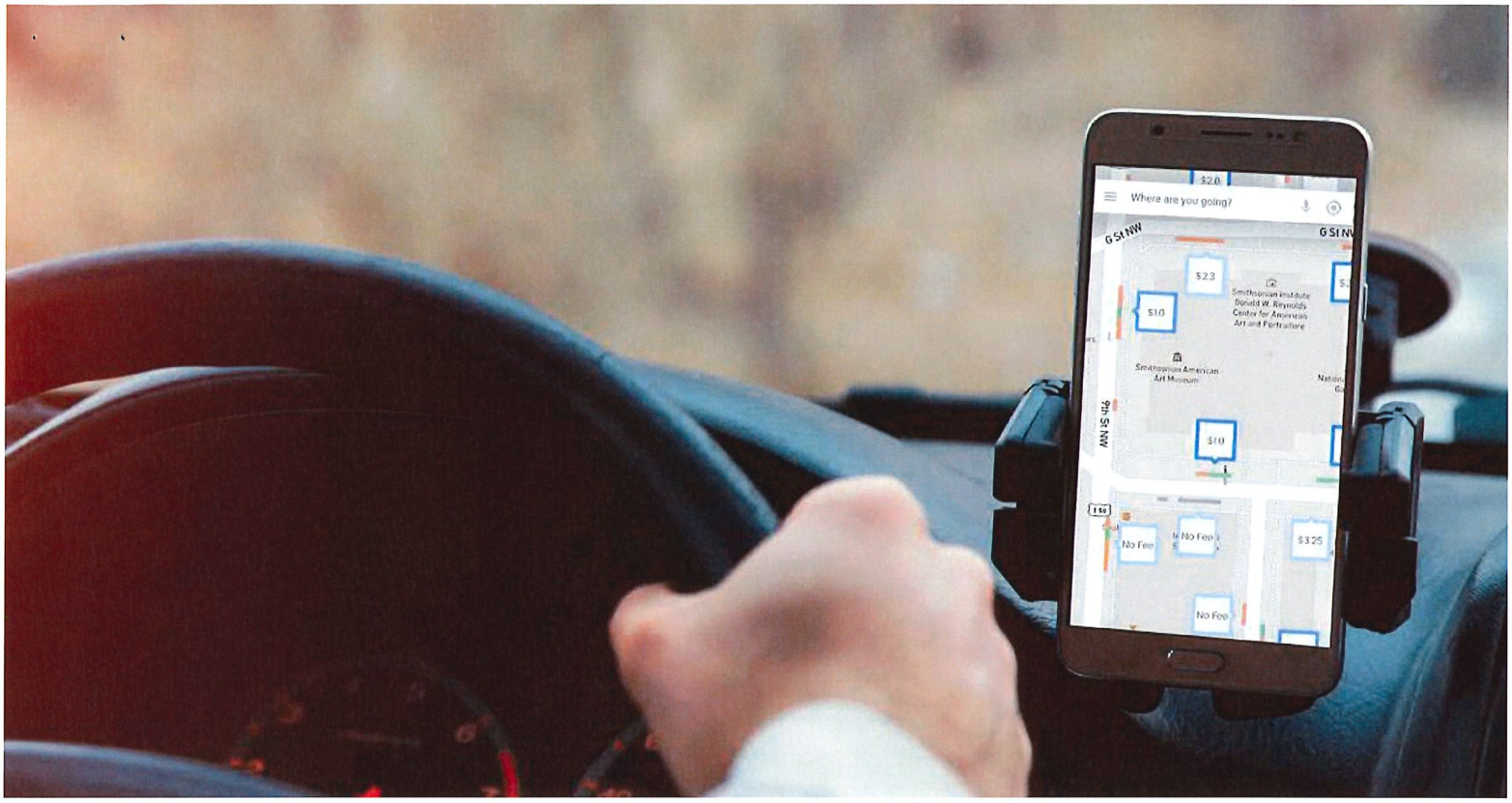
Fybr Insights allows cities to efficiently manage their smart parking initiatives—turning data from sensors into actionable information.

Built to handle tens of thousands of sensors and collect millions of data points daily, *Insights* helps communities understand the utilization of their parking infrastructure in real time.

Insights includes a variety of custom interfaces for evaluating real-time and historical data. Reports can be generated and downloaded for a wide range of data points, including occupancy, demand patterns, and parking session lengths for any space, group of spaces, or city-wide loading zone inventory.

Advanced alerts and monitoring tools deliver notifications when there is anomalous parking activity or an issue with a device.

Insights also includes APIs for connecting with other city management or public information interfaces, and/or third-party applications.



PARKING GENIUS

OUR WAYFINDING APP FOR DRIVERS.

Parking Genius is Fybr's wayfinding application—supplying turn-by-turn directions, parking availability, pricing, and time limits of spaces in real time. Integrations with payment providers, in addition to built-in payment capabilities, allow drivers to easily pay for parking once they have parked.

Parking Genius can be white labeled as your proprietary wayfinding solution and is available for Android and iOS devices.

Parking Genius can also be used to supply ride-sharing drivers, commuters, residents, and delivery drivers with real-time info that efficiently directs them to available curbside vacancies. This helps prevent congestion in loading zones and no parking areas, while reducing on-street traffic congestion.

It can also be customized to provide additional information and mobility services, including links to local transit information and schedules, and ridesharing services like Uber and Lyft.

Fybr's real-time data can also be used to relay parking instructions, convey availability updates, and help direct traffic during events.

FYBR ENFORCE

OUR APP FOR PARKING ENFORCEMENT OFFICERS.

Fybr Enforce is a mobile application optimized for efficiency—allowing parking enforcement officers to quickly find violations, perform automatic digital chalking, and prioritize their activities quickly.

Available for Android and iOS mobile devices, *Enforce* uses real-time violation detection and alerts to detect payment violations, no parking violations, and time limit violations so that enforcement officers can prioritize their routes and react to high priority violations immediately.

Enforce also allows officers to see all available space and occupancy information, including occupancy history, payment information, and quickly and easily generate and print tickets.

Data from *Enforce* gets fed into *Fybr Insights*—allowing city managers to track violations and visualize enforcement actions. Data is filterable to a single space, block, district, or the entire city.


FYBR'S TECHNOLOGY

FYBR'S TECHNOLOGY

WE OFFER A COMPREHENSIVE, MODERN FRAMEWORK THAT SPANS FROM EDGE DEVICES TO CLOUD SERVERS.

Our tightly integrated technology enables rapid development of custom solutions for a variety of IoT use cases. Built on a proven foundation, our platform minimizes time-to-market and the risks involved with building a piecemeal solution while maximizing return on investment and system reliability.

The foundational components of the Fybr Platform are:

FYBR ENGINE

An elastic cloud with a distributed stream processing core, a device data lake, a real-time asset knowledge graph and secure device life cycle management; the Fybr Engine provides highly customizable, machine learning empowered digital twins with streaming decision pipelines to help integrate physical devices into your enterprise business processes. Fybr Engine also provides RESTful and Streaming Application Programming Interfaces (APIs) along with pluggable enterprise integration modules to cut across silos and enables integration between enterprise systems and connected devices.

FYBR NETWORK

A highly optimized, secure, and reliable physical network for low-power wireless or wired devices, the Fybr Network provides a fault-tolerant, battery efficient, low-latency, high-throughput, encrypted, bi-directional communication layer that can simultaneously host multiple IoT applications. The Fybr Network works with the Fybr Engine to provide safe over-the-air upgrades, granular configuration management, security monitoring, and reliable delivery of device messages.

FYBRLYNK™

A wireless hardware module that is compatible with thousands of existing off-the-shelf peripheral sensors, FybrLynk provides hardware-based cryptography with encrypted key storage and comes in a drop-in form factor for easy PCB design and manufacturing. FybrLynk comes ready-to-connect with the Fybr Network—providing the ability to field thousands of devices with a low-power wireless network that has been proven to be reliable and battery efficient in harsh, interference-prone, city-scale deployments.

CHARIOT™

This Fybr Device Operating System comes installed on each FybrLynk module. The Device OS has baked-in Fybr Network protocols and brings with it the reliability, fault-tolerance, security, and power efficiency of the Fybr Network. The Fybr Device OS also provides a safe sandbox environment for programming edge devices with customer business logic—improving the speed of iteration and innovation of IoT solutions by significantly reducing the risk of accidentally pushing bad firmware updates that may destroy an entire network.

FYBR TOOLCHAIN

Fybr provides a comprehensive set of tools to develop, integrate and operate IoT solutions—helping businesses run better. The Fybr Toolchain includes an operations dashboard designed to help install, configure, and monitor devices; APIs and integration tools to integrate with enterprise services; visual application development tools to help program edge devices and their digital twins with business logic; and a hardware development kit to build FybrLynk-based devices.

END-TO-END SECURITY

THE FOUNDATION OF OUR PLATFORM AND OUR FIRST CONSIDERATION.

Fybr's patented ecosystem has been built from the ground up; creating an ultra secure platform where edge devices can securely exist in numerous highly public and urban settings.

To securely live in public spaces, each device needs to be a trusted platform that doesn't compromise the security of the whole platform. With numerous examples of attacks on IoT platforms that use shared keys, store keys in firmware, or perform cryptography in code, we mitigate these scenarios by incorporating a secure cryptographic key storage and a secure cryptographic processor.

Our devices quarantine cryptographic functions from the microcontroller in a hardware-based AES black box—performing operations based on the keys without revealing the keys to the microcontroller.

However, processing of keys is only one part of the equation. Secure session key delivery is essential. Each of our devices contains a unique set of keys exclusively used to securely deliver session keys, which are unique per device and can be securely changed at any time.

Most importantly, by controlling the entire chain from edge device to server, our platform offers true end-to-end authenticated encryption—ensuring that any packet received anywhere within our ecosystem is known to be free from tampering.

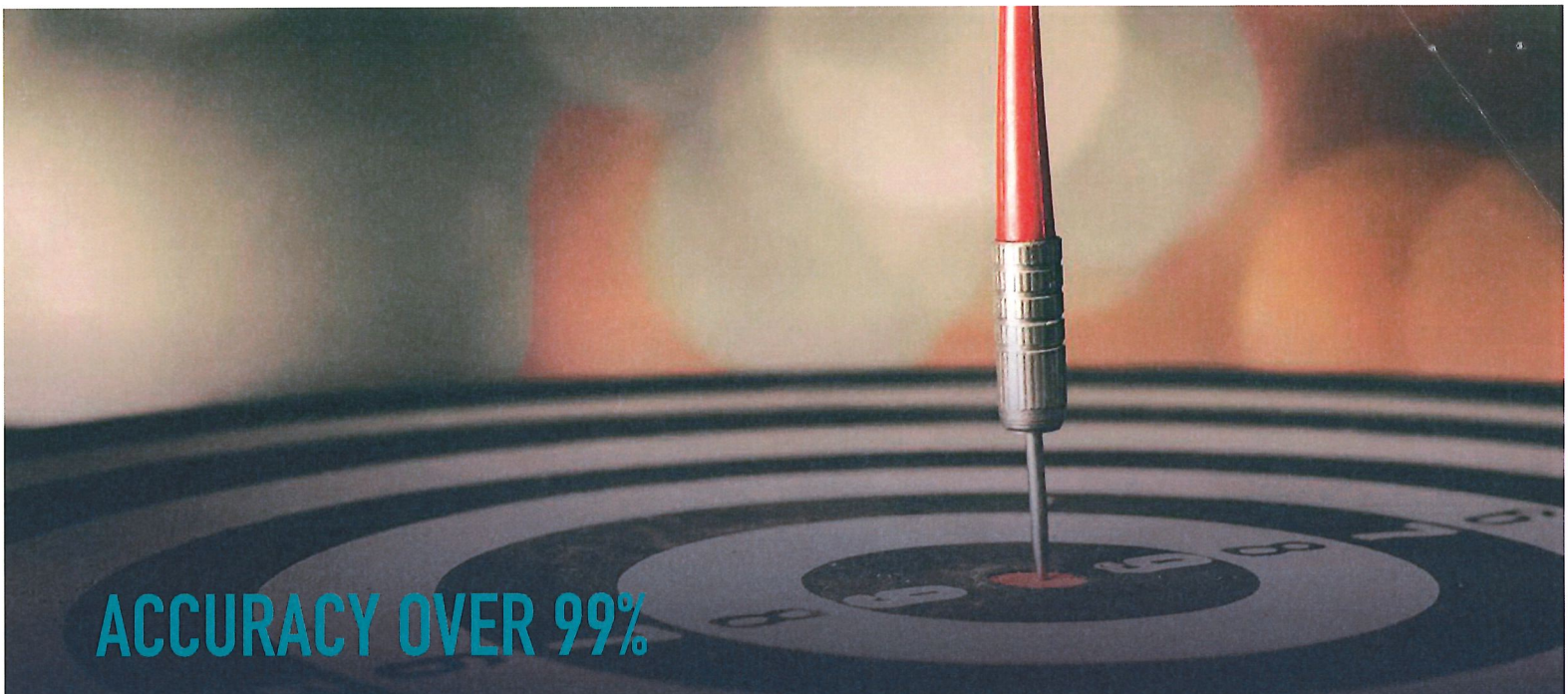
Our gateways are simply proxies that do not possess end-device keys at any time, meaning they cannot decrypt communications originating from, or destined to, any end device—further reducing the risk of malicious attacks.

Our ecosystem provides for both confidentiality and authentication of data—making it safe from replay attacks.

When needed, firmware patches are protected by independent encryption using unique keys. This guarantees that only approved and authenticated code is applied—denying an attacker a chance to inject malware.

Because we use end-to-end encryption, our gateway-specific command and control communications are protected by the same technology. Industry-standard TLS protects our gateway-to-cloud and cloud-to-application traffic.

All of the above pertains to data-in-transit. Our data-at-rest is encrypted using industry standard protocols, while denial-of-service attacks are detected and mitigated by our cloud providers.



ACCURACY OVER 99%

FYBR'S PROPRIETARY AUTOMATIC SELF-CALIBRATION FUNCTION ADJUSTS EACH SENSOR TO LOCAL AND MAGNETIC CHANGES THAT OCCUR OVER TIME —RESULTING IN OPTIMAL, CONTINUOUS ACCURACY OF 99% OR GREATER.

Fybr's platform outperformed other competitors in a recent pilot in Columbus, OH.

The Columbus evaluation team used RFP responses, references, reputation, etc. to narrow the field from over 20 applicants to just three for a head-to-head comparison.

After one of the most thorough and rigorous evaluations Fybr has participated in, our performance in a three-month, head-to-head evaluation is shown here.

This mirrors the outcomes of several other evaluations in which we have participated.

Project: Parking Space Availability Technology Pilot

Date of Evaluation Committee Meeting: 02/13/2020

	Max Value	Company 1	Fybr	Company 3
Installation	25.00	18.33	23.00	17.33
Integration with existing parking enforcement applications	25.00	18.00	20.67	17.33
Integration with Park Columbus Mobile App	0.00	0.00	0.00	0.00
Accuracy	50.00	28.33	45.33	25.67
	100.00	**64.67**	**89.00**	**60.33**

Comments: Fybr was communicative with scheduling, met timelines, provided a detailed installation, and coordinated well with city staff. Fybr results were the most accurate, and the firm met integration expectations of the initial pilot program.

fybr

CASE STUDY: SAN FRANCISCO

GOAL: MAKE PARKING EASIER TO FIND.

Federally funded through the Department of Transportation's Urban Partnership Program, SFpark was a parking pilot that sought to use innovative technology to test a new approach to manage parking in San Francisco.

With Fybr's help, the city was able to collect and utilize real-time data to identify parking availability and implement demand-responsive pricing to help make parking easier to find.

CHALLENGES

The San Francisco Municipal Transportation Agency (SFMTA) identified that historical parking management methods emphasized flat meter rates and short time limits to achieve turnover. However, this method was not convenient for drivers and it did not create optimal levels of parking availability. The SFpark pilot had many goals, but the primary focus was to make parking easier to find.

SOLUTIONS

Fybr was the turnkey provider of parking sensor hardware, maintenance, and data delivery for the federally funded SFpark program. Fybr designed, manufactured, installed, and maintained all of the sensor and sensor-supporting hardware (gateways, repeaters) used on the project in addition to approximately 11,000 parking sensors in 8,355 parking spaces monitoring all motorist arrival and departure information for three years. A combined office and maintenance facility of about 10 personnel was maintained and staffed by Fybr in San Francisco for the duration of the contract. The data collected by Fybr was transmitted electronically to the SFpark database.

OUTCOMES

- The amount of time reported to find an available parking space decreased by 43% in the pilot areas compared to 13% in the control areas.
- In SFpark areas, the SFMTA gave 23% fewer parking meter-related citations per meter than before the pilot.
- Greenhouse gas emissions decreased in the pilot areas by 30% compared to 6% in the control areas.
- Peak-period congestion was reduced and double-parking in pilot areas decreased by 22% versus a 5% decrease in control areas.
- Overall city parking revenue went from $66M annually to $99M within three years.

CASE STUDY: WASHINGTON, D.C.

GOAL: MAKE PARKING EASIER AND REDUCE CONGESTION DOWNTOWN.

The District Department of Transportation's ParkDC pilot successfully implemented a cost-effective, data-driven approach to managing on-street parking in two of the District's busiest neighborhoods.

The deployment of Fybr's parking sensors was successfully combined with a range of data sources, including transactions, historical occupancy, and citations to produce real-time availability information and inform pricing algorithms.

Due to the success of the pilot, DDOT is currently working to expand demand-based parking pricing to other District neighborhoods..

CHALLENGES

The growing number of residents, commuters, and visitors circling to find parking and parking illegally was creating congestion and stress in the District. There was limited information on parking availability, and illegally parked vehicles were impacting public safety by blocking critical routes for emergency responders.

SOLUTIONS

Conduent currently operates the Fybr Platform in Washington D.C.. Parking sensors, air quality sensors, gateways, and weather stations have been operating successfully since the program launched in 2015 with a near flawless record in terms of accuracy, latency, and battery life. Fybr is the turnkey provider of parking sensor hardware, maintenance, and data delivery for the ParkDC program. Fybr designed, manufactured, installed and maintains all of the sensor-supporting hardware being used on the project in addition to all of the parking sensors monitoring motorist arrival and departure information for each space. Fybr installed the system with about eight personnel and maintains the system with two part-time local employees. The data collected by Fybr is transmitted electronically to the Conduent database.

OUTCOMES

- Better information, viable occupancy detection, and demand-based pricing has helped to reduce parking congestion downtown.
- Parking availability increased in high demand areas and empty spaces were more utilized. At the beginning of the pilot, 62% of block spaces had the desired level of usage which increased to 72%.
- Collected data continues to prove that parking pricing plays an important role in addressing parking demand. By increasing time limits and lowering prices in low-demand areas, occupancy increased by 12% and length of stay increased by 14 minutes.
- Parking customers reported a 7-minute decline in the time it took to find parking.
- The connection has been made between roadway congestion and curbside management. As the supply of parking spaces opened up, circling, illegal parking, and double parking decreased.

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I wanted to take this opportunity to introduce the City of Kirkwood to Fybr. We are a turnkey IoT Smart City solutions provider with a ready-to-deploy parking and curbside management solution—including in-ground parking sensors, a highly secure network, real-time parking availability data, mobile/web apps, enterprise data management, and third-party integration.

With over 20 years in business, a longstanding history in the parking space, and experience with multiple large-scale deployments, we have helped numerous cities and campuses—such as Columbus, OH, Washington, D.C., Montreal, San Francisco, and Texas A&M University—by delivering accurate, reliable, real-time data across thousands of devices in some of the harshest urban environments.

Most recently, cities such as Columbus, OH, have chosen Fybr's parking solution after rigorous testing and comparisons to several similar technologies. When our solution has been tested in head-to-head pilots, Fybr has always been selected as the clear winner, with high marks on accuracy, quality of product, and overall working relationship.

To date, we have sold and managed our installations of technology—mostly because we are passionate about getting the project done right with the absolute best results possible. We also believe Fybr's technology includes the best, most accurate sensors available today.

I am reaching out to Kirkwood for a few reasons.

As a 10-year resident of Kirkwood, I am very familiar with the driving and parking experiences in the downtown area. After reviewing the Downtown Master Plan, it was exciting to see the vision for Kirkwood's future. When reviewing the parking study section, I found that many of the parking challenges identified are those that Fybr helps cities with every day. By assisting communities with monitoring and managing their parking inventories, not only do we help citizens and visitors easily find available parking, we also allow cities to better utilize and monetize their existing parking infrastructure—all while giving them the real-time and historical parking data to plan for the future.

Additionally, as a technology company, Fybr is continually developing, testing, and striving to improve our offerings. Having a local, full-scale deployment would be of tremendous value in helping us further our development.

We believe that we could help Kirkwood in the near term by assisting the City in leveraging one of their most valuable assets—parking—to improve traffic and safety in the community while generating additional revenue.

We are prepared to offer a deployment at no cost to the City, consisting of up to 200 parking sensors and the associated network. Our recommendation would be to place sensors in each on-street space along East and West Argonne from Taylor to Clay, as well as in the surface lot adjoining the train station.

The following document goes into the details of our platform and experience. I've also included some revenue models using information from the Downtown Master Plan that illustrate some of the City's revenue potential.

I realize this may be a lot to digest. If you have any questions at all, please don't hesitate to contact me.

Matt Willenbrink – Chief Marketing Officer

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fybr