FORD CES 2018 KEYNOTE: "THE LIVING STREET"

Delivered by Jim Hackett, President and CEO, Ford Motor Company

We're here in a time in history talking about a topic that hasn't been reviewed since the inception of the automobile.

You might wonder why a furniture guy would be asked to run an automotive company? Well, I was here 25 years ago when the furniture people had to make room for disrupting technology. And here we are today, with a new generation of disruptive technologies being feathered into the automotive world.

New technologies and innovations are making it possible for us to share resources in ways we never could before – not just information, but jobs, rides, rooms, food, and much more.

But not everyone is sharing in the benefits. Many of these new advances have prioritized scale and growth, over expanding access and improving lives.

I've been CEO of Ford for just over 220 days now. In that time, I've thought a lot about our role and responsibility in the dawn of this new era of intelligence. I keep pushing on the question: how do we combine vehicles and technology so they become something more than the sum of their parts? Kind of a 1+1 =3.

There are actually some important parallels and lessons from Ford's history to think about as we begin to introduce revolutionary technologies into our civic life once again.

When I was a kid in Central Ohio, we had an old, bumpy road called Route 40 that connected us to the rest of the state. When a newspaper ad announced the launch of Interstate 70 to replace Route 40 it was like a revelation. Interstate 70 was part of a new transportation operating system, made up of interstates and sophisticated traffic systems.

It spawned new industries and companies, and drove generations of personal and economic growth. This system at its inception had great attraction. People were able to attend schools that were further than they could walk or take a bike. High-quality healthcare was made available to everyone. The ability to easily drive longer distances opened up farm land outside the city core for new lower cost homes.

And yet, over time as our towns and cities were designed around the automobile, parking lots overtook the community centers and town squares were converted

into intersections. Fast food chains that advertised the benefits of "driving through" crushed the family-owned diners and restaurants. Farms were pushed away from the city center – in fact, today the average American meal travels 1,500 miles from farm to table. Time we used to spend with each other is now time wasted in congestion and traffic.

The early automobile turned out to be the ultimate disruptor to human's lives. The price for freedom to move was the creation of a world where roads that were built for cars, replacing streets intended for living.

This is the paradox of innovation: by enabling one kind of freedom, we constrain others. Everyone in this room understands this paradox.

Year after year, for five decades now, visionary entrepreneurs and innovators have come to CES to explain how their latest products will give us some new potential: "access" to faster, bigger and more…

We've personalized, digitized and atomized every experience – when we watch, how we shop, what we eat, who we trust…and yet, at times this has been at the expense of our shared sense of belonging.

With 115 years of pioneering innovation at Ford, our company also understands this. We also know that just because these tradeoffs are expected does not mean they're acceptable – or inevitable.

The time has come to fundamentally update our approach and shift our central mission to harnessing technology as a tool to serve human needs, to improve lives and to help restore our genuine sense of community.

That is something Bill Ford and I talk about often. Our company was founded on the promise that freedom of movement drives human progress.

Now, with the power of AI and the rise of autonomous and connected vehicles, for the first time in a century, we have mobility technology that won't just incrementally improve the old system, but can completely disrupt it. A total redesign of the surface transportation system with humans and community at the center.

Today, the transportation systems in most global cities have reached capacity. As more people seek to access the benefits concentrated in our great urban centers, these already stressed systems will falter, unleashing overwhelming pollution and paralyzing congestion.

But if we move quickly, and dramatically shift our thinking, we can redesign transportation in our cities in ways that not only meet the growing demand, but improve quality of life for all of us at the same time. It's time to bring our streets into the sharing economy. And we can't wait.

As technology has gotten faster, bigger and more invasive, people have grown increasingly anxious about the impact tech will have on their personal lives, and let me add "to our shared civic life."

In this past year, we've seen analog and digital tensions boil over. People are afraid that countless security breaches have left our personal information vulnerable to misuse. Whole towns and neighborhoods are beginning to fight back against digital intrusions – closing off their streets to non-local drivers due to the gridlock caused by well-intentioned navigation apps.

Together, we can create cities where density and diversity give life - where packed streets and sidewalks prompt the unexpected encounter or the chance discovery and feed the innovation that is the lifeblood of cities.

And... as my good friend, the theoretical physicist Geoff West found in his research about what happens as cities scale – when you bring together diverse populations in urban environments, the likelihood of "unconventional innovations" increases exponentially.

To achieve that, we need more than just new technology. We need to align our goals as a society. We need a new way of thinking about "freedom of movement" – so that we consider not just vehicles and streets, but the destinations, too.

We need a new civic freedom, where the benefits of community can be extended to many more people across many more backgrounds.

But, imagining a dream city is easy. Rebuilding the existing ones will take real imagination – and commitment. But as transportation guru, Janette Sadik Khan likes to say, "If you can change the street, you can change the world."

That's why, at Ford, our work on this important task of building the City Tomorrow starts at the ground level – here on **The Living Street**.

What you're seeing is the work of Alex McDowell and his team at the World Building Institute. They are building "future realities," gathering information from labs, architects, designers, technologists and urban planners to envision this model of the living street.

The Living Street is something akin to a SimCity -- a kind of digital proving ground for our smart vehicles for a smart world approach. It allows us to grapple ahead of time with technology's unintended consequences and, together with cities and partners, chart a human-centered course forward.

Today, we share just a glimpse of the model living street – the part that's been built so far. As you head down the street, you see that just as the analog vehicles sat in an analog world, our systems approach links the power of deep learning with edge computing or the internet of things. Changing one piece of a system necessarily changes the whole – a car learns to drive itself and a city's transportation grid will shift around it.

Every city has an underlying operating code that reveals the meaning and the opportunities that are available for people to interact with what happens in their community. But we can't think of cities as computers to be programmed to maximize efficiency.

This depiction of the City of Tomorrow demonstrates the benefits of introducing smart vehicles for a smart world into our civic life. Millions more can move into cities and they can be LESS congested. Look at how the curbs are full of trees and benches, not double-parked vehicles.

See how streets can be designed so that they serve a variety of functions and needs, maximizing multi-use, flexible lanes for people walking, people biking, people who own and use businesses, private and public vehicle usage, relaxation, exercise, connecting with others, and much more. Look at how the intersection adapts to different street concepts, creating safer intersections, roads and curbs for drivers, pedestrians and bikers.

We're just beginning to appreciate what the technology will make possible – and appreciate the new challenges that will arise. I want to us to think together about the ethical and moral questions around analog and digital tensions.

This morning, I want us to spend some time discussing these challenges, so we can design this in a way where we get right what Henry Ford got right – the freedom of movement – but avoid making the mistakes of the industrial age, where that freedom of movement came at the expense of community or our connection to each other.

That's why I'm here at CES. Not to sell cars. The systems design challenge we have today, is to take the passion that exists in our vehicles, feather in the new and ever-evolving technology... and interpret that technology in a human-centered way.

This is not just our challenge at Ford. The technology and services you see on the living street will be open, collaborative and inclusive, and designed and deployed with active participation from the community – local governments, civic leaders and citizens.

And in order for smart vehicles for a smart world to work for our cities, we need your participation. I want you to be excited to work with us to usher in a new civic freedom.

I have asked a few of the key Ford leaders working on the technology around this Living Street to share more about what we are developing and deploying in our cities, and how these new innovations will help those cities, and our societies at large.

Then, before we leave here today, I want us to start that discussion I mentioned – really start to wrestle with some of the tensions we're all seeing and think about some of the big questions relating to the impact all these new technologies have on our civic life.

First up is Marcy Klevorn, Ford's President of Mobility, whose team, along with our partners, is developing an open platform for transportation as part of our plan to move people through cities in every way.

It's my pleasure to introduce Marcy Klevorn…

MARCY KLEVORN:

Thanks, Jim. Good morning everyone.

Last October, we announced our investment in Autonomic, and today, against the background of the Living Street, I'm excited to share some updates from our work.

Ford is working with Autonomic to develop the first transportation cloud for cities, an open, cloud-based platform for mobility services.

Our Transportation Mobility Cloud, or TMC, will unlock the power of connected components at all levels of city transportation systems, not simply to improve the technology, but to unlock the value for people who live, work and play in our cities.

TMC will support the rapid development of services and applications that will enable people to move more efficiently and have access to smart, connected transportation.

It can do this, because the TMC offers a universal language and toolset across all mobility platforms and services allowing all the players in the transportation system to interact.

We are building the base functionality of the cloud, to include core elements such as mapping, routing and payments, in a standardized way. And an infinite number of innovative new services can then be built on top of this cloud, taking advantage of the foundational elements.

We think about this as similar to a box of Legos with pieces that we can combine to create different assets, products and services, to benefit city dwellers around the world.

People will get access to a new mobility experience. App developers will be able to easily leverage connected vehicles and other components of the smart world - such as GPS and sensors. And cities will be able to optimize their transportation system for their residents and visitors in a way never possible before.

Since every city is unique, with its own regulations, traffic patterns and local customs, our flexible assets will serve them all. For example, with control of their traffic flow, enabled by TMC, cities might choose to reroute people to avoid construction, speed up emergency response times, or manage traffic around major sports or special city events.

But this is not a Ford system – we're building it for everyone.

Nobody else is talking about providing an open community like this around mobility. There have been a lot of interesting innovations in mobility and connected technology, but until now everyone has had to optimize for their own system component. That's because an open platform with a universal language and services didn't exist.

That's why we're designing this with cities in mind. We don't have the luxury of building some sort of perfect world in a laboratory. We are building solutions for cities that are already alive and functioning and to benefit real people with dynamic and diverse lives. So this has to be done with full participation and direct engagement with our cities.

Let me show you the possibilities of real-time transit choreography and how it plays out on the living street…

What you see here is how an application service powered by the Transportation Mobility Cloud can coordinate routes to help anyone accomplish what they need to do during their day and still get home on time.

[VIDEO BEGINS]

This couple is taking advantage of multimodal transit to optimize their journey home. The platform is connecting the smart streets with their vehicles, and with everything around them. They're talking to each other and to the transportation mobility cloud that's getting them home.

When that couple suddenly gets a surprise invite – to help their friends celebrate their engagement – they don't have to think twice about saying they'll be there.

Real-time location updates will change their routes and their modes of transportation. On the living street, the system is always at work. And when you multiply this by millions of people and hundreds of cities - you begin to understand the potential.

Our couple can easily switch modes of transportation. Maybe they grab a self-driving Lyft vehicle. Maybe they decide to ride a bike share. With the Transportation Mobility Cloud the result is a healthier, more dynamic city culture. It enables the transportation operating system to improve safety and reduce traffic.

And it's not just about moving people. This technology will make it possible for people and goods to be connected along the same route. When you are heading to a special event – like our couple – everything and everyone will arrive in the right place at the right time.

What's most exciting is that we are designing this with cities in mind – and with cities involved. The smart city will dynamically change the rules of the road to improve congestion so journeys like these unfold smoothly.

This is one example of what will be enabled by TMC. In fact, right now we are using the TMC at Ford to manage our Chariot micro-Transits.

There is also an infinite number of innovative new services that can be built on top of this cloud. That's what we're asking you to imagine – and help us to create.

And we're inviting everyone to build the applications and services that will enable the living streets and the connected vehicles of the future's smart cities to reach full potential.

Ford has a tradition of democratizing technology from last century's automobile to last decade's Ford SYNC. We see this as a fundamental value at Ford. So, we're planning an open developer community program and we invite you to participate.

Stay tuned for more announcements later this year.

The reason we're so invested in building this open cloud-based platform and the services it enables is to provide people with more efficient movement and access.

Eliminating congestion not only improves the efficiency of cities, it creates economic and community benefits as well. Pedestrians are the predominant customers for ground floor retail stores. We also can manage our curb better, remove parked and idling cars, and instead, plant more trees and share fresh air with more in our community.

Now, to talk about how we're connecting vehicles in this system – using the Cellular Vehicle to Everything, or C-V2X technology, let me bring out Don Butler, Ford's executive director of Connected Vehicle and Services.

DON BUTLER:

Thanks, Marcy. Good morning everyone.

The TMC Marcy just described has the potential to change the way we move through cities. That cloud is enabled by the smart, connected world and the data that comes from it.

I'm excited to talk to you about that smart world where vehicles are connected, not just to each other, but to every smart component in a city.

C-V2X has the potential to enable a city's various technologies and applications to share information with each other, from vehicle to pedestrians and bicyclists, to the whole infrastructure, enabling collision avoidance safety systems, traffic signal priority, and more.

It does this because at its most basic level, C-V2X is a two-way conversation. And that conversation creates new compounded data sets, which everyone, including city planners and transportation service providers, can have access to in real time to help solve mobility issues.

Today, Ford has over 700,000 connected vehicles on the road, and by next year every new Ford vehicle in the U.S. will be connected. Our ambition is to build on this core connectivity and bring C-V2X technology to our vehicles and to cities around the world.

We are taking this major step to connect our vehicles to the environment through a strategic collaboration with Qualcomm. We've engaged with Qualcomm in beginning field trials to demonstrate and prove the promise of the technology.

C-V2X is the foundational technology that will enable fast, safe, secure communications. We encourage its broad adoption and that's one of the reasons we're part of the 5G Automotive Association and we're in discussions with government agencies in the U.S. and governments around the world: to advocate for its adoption.

Why is this so important? Because people want to think that there is only one cause of congestion, but there isn't, and there isn't one simple solution either. You can't just take vehicles off the street, or expand public transport options. You can't just improve the quality of data sharing.

Our communities are intertwined. So to address congestion, we have to make the whole system more intelligent and more dynamic. We have to connect everything.

Through C-V2X technology and the data collected from connected vehicles, we can help communities manage curb space and optimize traffic flow based on real-time vehicle usage information, and that's how we can unclog the streets. Connectivity also powers high-occupancy solutions, like Chariot, which already increases street carrying capacity.

With C-V2X, the communication between your vehicle and everything around it is instant because it does not require a network. That means information can be conveyed at critical moments with better performance and reliability.

[VIDEO BEGINS]

Let me walk you through a real-life situation – and explain how it would unfold differently on the living street.

C-V2X enables a vehicle itself, without requiring a network, to communicate when a driver like this needs help. Maybe he has diabetes and is going into shock, or he has sudden chest pains.

When his life is in danger and he's not able to send a message himself, C-V2X can coordinate the response. The system can recognize the driver's distress and signal to emergency responders quickly and reliably.

The car can assume control from the driver, pulling over to the curb where emergency workers can treat him. The vehicle can even send medical records for drivers who have opted in for that. First responders, doctors, hospitals: They're all contacted simultaneously.

Additionally, C-V2X can redirect traffic to allow safe, immediate access to the patient.

And this is just one example of how C-V2X makes it possible for a city to reconfigure itself for the good of its citizens by harnessing the power of a connected community.

Imagine an urban environment functioning in unison to solve one man's life-threatening crisis. Imagine connecting people, vehicles and streets to make the city safer and better. These are the outcomes C-V2X makes possible. Everything working together to save a driver's life.

The safety benefits alone are powerful. But there are many other reasons for cities to adopt a C-V2X future, from decreased commute times to ways to help local businesses. And for those benefits to be realized, we need to help cities get connected.

That work is being led by Ford's City Solutions division – the only one of its kind in the industry. They are focused not just on how to connect cities to new technology, but also to help them use the data to manage their streets and traffic flow.

A language needs to be created, so that all the information can sync up, and all the sensors and vehicles can process the information. We're helping to write that language – helping to craft the new rules.

By contributing to the new standards and protocols that allow everyone to work together in the future, we can ensure that we fulfill the promise of the new civic

freedom Jim Hackett was talking about earlier, where everyone is once-again is part of the community.

Optimizing at the systems level also requires the components in the transportation ecosystem to be able to communicate – to speak that same language. We believe that C-V2X is how that common language comes together.

C-V2X enables various technologies and applications in a city – including stoplights, signs, bikes and pedestrian devices – to share information.

This technology, inside an efficient, connected and optimized transportation system holds the potential for a whole new approach for moving goods, distributing content and serving humanity.

In the future cities will be able to do everything from freeing up curb space, to improving traffic flow, to providing greater access to mobility for chronically underserved citizens who live in transit, food and healthcare deserts.

Now, let me introduce Jim Farley, a legend in the auto business and a key leader of Ford's efforts around self-driving vehicles, to talk about where these elements go next.

JIM FARLEY:

Thank you, Don. Good morning everyone. Such a great morning and it's great to be here at CES talking about the future together.

Over the past century, progress in the automotive industry has been incremental. But that approach won't work when it comes to autonomous vehicles.

Today we have an opportunity to make a big leap forward. Self-driving vehicles can do more than enhance mobility as we know it. They can transform communities.

Let me explain what I mean: At Ford, we're introducing a whole new self-driving business model. The technology race is fascinating and it's cool to see all the concepts, but just thinking about the tech -- and just adapting existing vehicles – misses the big opportunity.

We're thinking about a systems-based approach -- with a larger impact – moving people and goods _and_ serving humanity – with self-driving technology at the heart of it all.

The approach is built on two important foundations: a partnership platform enabled by flexible APIs, working those vehicles at high utilization.

We are building a platform that connects everyone and everything. And, our platform will be open to all partners. So all companies involved, big or small, can operate in a robust, seamless way.

Second, the vehicle, the software and the computing systems are being designed and built commercial grade, to withstand the rigors of high-mileage and heavy-duty use in tough urban environments.

That's where Ford is really different. We have deep expertise engineering hybrid vehicles for heavy use in commercial operations such as taxi fleets and police.

Anytime you're not carrying goods and people, you're losing money. Our customers expect their vehicles to be on the road, not in the shop, charging or getting repairs. And without that reliability and up time, the public won't trust this new world… and adoption of self-driving technology won't achieve its full potential.

This year is going to be a really big year for Ford testing self-driving vehicles. We've already partnered with Argo AI in both Detroit and Pittsburgh. Separately, in our first city, we will test drive our business model itself, learning and incorporating these learnings into our autonomous vehicle experience.

We're already engaged with the local government and will announce the city in the months ahead.

We will be working with new and existing partners, like Lyft, who has been instrumental in helping us design and build our platform with the necessary APIs, and Domino's Pizza, which has already helped surface crucial insight into the customer experience.

We're learning how customers want to access the car – keypad or voice – and on what side of the car do they approach to take delivery. These insights are incredibly powerful and will be at the heart of the design of our unique, dedicated self-driving vehicle.

A deep understanding of the behavior of the customer, the business of our partner companies and the needs of cities is what will differentiate our autonomous vehicle. The self-driving experience is new to all of us, so we need to design a vehicle that is all-new for autonomous vehicles specifically.

The work we're doing this year will put us in a position to scale quickly with a self-driving business in 2021 that prioritizes the human experience.

And today we are proud to announce our newest business partner: Postmates – with its 150,000 person strong fleet of on-demand couriers. When you combine the power and reach of self-driving vehicles with the deep knowledge of the Postmates team, the scale and scope of the expertise we put into action grows exponentially.

In addition to goods delivery and ride-hailing, one of our most important partners in this area, is the cities themselves. Working with cities, we are committed to making sure this network serves everyone, especially the underserved.

Now, let me show you how these next-generation delivery opportunities integrate with the living street:

[VIDEO BEGINS]

Think about all the small businesses that exist in a thriving urban neighborhood: the dry cleaners, the coffee and flower shops, a local bookstore – maybe a corner grocery stand like this one.

Now imagine that corner grocer had access to a self-driving delivery vehicle.

Right now, that small business owner has to cut her hours or even close her shop to make deliveries. But with a self-driving vehicle, moving her goods would be a seamless part of her business and the city.

With this technology, delivery routes would be designed and optimized in real time, reducing traffic, improving efficiency, and supporting small businesses across entire cities.

While that grocery delivery is on the way, another business – the local dry cleaner – is able to make a delivery too – all accomplished by a seamless transition of one self-driving vehicle between businesses.

The vehicle reaches its customers quickly – no wasted time, no double parking, no unnecessary idling.

A single self-driving vehicle, doing work that used to require multiple vehicles and drivers – will lower costs for the businesses and reduce environmental impact on the community, making life better for everyone.

Customers are happy, neighborhoods are well-served, and that small-business woman is finally able to see her grocery business grow and expand. And most importantly – communities thrive.

Picking up on that theme of community, let me bring back out, Jim Hackett to help lead the final portion of our program.

JIM HACKETT:

Thank you, Jim, this has been terrific.

Before we go to the last part of the program, I'd love you to underscore for folks that last point about what makes our community-centered approach so different.

JIM FARLEY:

Sure. Put simply -- we are thinking not just about the autonomous vehicles -- the fleet -- but also the network, and the software enabling all kinds of different partners to plug into our system.

And we're designing that system to expand reach and especially to serve communities that right now are being left behind.

JIM HACKETT:

Exactly, we need that systems approach and flexibility... to always be designing for people... aligning goals with communities... and helping guide transportation choices to ensure the promise of mobility is available to many more people.

But we also know when considering the potential benefits of new technology, we have to consider the new challenges they pose as well.

Years ago, I met Harvard ethicist, Michael Sandel. We got to talking about his book, *Justice*, and the course he teaches at Harvard.

Michael believes in the lost art of democratic argument, as a way to model for other communities how the exchange of ideas can serve to strengthen the bonds of our communal life.

Michael has helped our team at Ford wrestle with these challenges. And now we want to open that conversation up to include all of you.

Please welcome Michael Sandel.

[DISCUSSION BETWEEN JIM HACKETT AND MICHAEL SANDEL REGARDING DATA SHARING AND PRIVACY, INCLUDING AUDIENCE PARTICIPATION]

JIM HACKETT:

We have to wrap up for today – but I know this is just the beginning of the conversation.

First, I want to thank Michael Sandel, my entire Ford team and all of you for being here today.

For generations, the automotive industry has largely focused on just one part of the equation. We know that won't work when it comes to the new smart mobility - we need to take a broader view.

After all, what's the point of building amazing mobility solutions if those solutions don't improve the destination?

At Ford, we have always sought to work with the most forward-looking and imaginative innovators and engineers. We've done it for 115 years – and that won't ever change.

None of us have all of the answers, but I know we will be on an extraordinary and worthwhile journey together.

So, if you are interested in learning more or partnering with us, please take some time to come visit us in the North Hall.

We're open for business.

Thank you, and have a great CES!