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Ford

Go Further

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Mobility & Transactions

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March 27, 2019

BY E-MAIL AND FEDEX
Chairman Ajit Pai
Federal Communications Commission
445 12th Street S.W.
Washington, D.C. 20554
ajit.pai@fcc.gov

Re: Swarm Technologies Part 25 Authorization Application No. SAT-LOA-20181221-00094

Dear Chairman Pai,

On behalf of Ford Motor Company and its wholly-owned subsidiary, Ford Smart Mobility LLC (collectively, "Ford"), I am writing in support of Swarm Technologies' Part 25 Application for authority to launch and operate a global narrowband satellite constellation. Swarm's constellation will significantly lower the costs of connectivity and expand the number of businesses, devices, and people that can afford to gain access to satellite communications. Further, Swarm will be able to rapidly deploy its satellites to provide global connectivity to even the most difficult-to-serve locations on the planet.

Ford is an American multinational automaker founded in 1903 that produces millions of vehicles annually and currently employs over 100,000 people in the US and 200,000 people worldwide. Ford has worked tirelessly to become the industry's most trusted mobility company. Ford helps people to move more safely, confidently, and freely anywhere in the world. Ford's success is based significantly on our commitment to innovation, both our own and through the partners with whom we work. Our partnership with Swarm highlights this commitment to innovation, through satellite services that serve customer safety and experience.

Ubiquitous network coverage is essential to the future of connected transportation, as it enables critical telematics and emergency data relay from anywhere on Earth. Connected vehicle applications supporting emergency response (such as vehicle location and airbag deployment or impact sensor data), vehicle diagnostics, and location tracking are crucial to ensuring driver safety. These types of data transmissions often <u>rely upon satellite connectivity</u> in remote regions both in the U.S. and globally.

Swarm's unique network service and hardware capabilities, and the associated low costs enabled by their technology, are of great interest to Ford to enable global connectivity for our vehicles. It is our strong view that the network service described in Swarm's Part 25 application can be offered at the industry's lowest costs, and in so doing, open new markets that current satellite technology cannot satisfy. This is further evidenced through Swarm's partnership with Autonomic, a connected vehicle infrastructure subsidiary company that Ford has chosen to power our commitment to connectivity in 100% of new vehicles starting this year. Autonomic's Transportation Mobility Cloud (TMC) will be the largest connected vehicle infrastructure globally — serving automakers, OEMs, and transportation companies of all types in the U.S. and around the world. Working with Autonomic, Swarm's technology and connectivity will be extremely valuable to the entire automotive industry.

Over the past 18 months, Ford has worked with Swarm to explore future communication services for which Swarm submitted a Part 25 license application on Dec. 21, 2018. Ford has worked with Swarm on evaluations of the performance requirements and operating characteristics for the Swarm system as applied to Ford's connected vehicles. Our Mobility group, Research and Innovation Center, and leadership team have engaged in a series of meetings, trade studies, hardware and software integrations, and network design collaborations. Ford supports Swarm's request for authority to construct, launch and operate its satellite system. Ford has a strong interest in becoming a customer of Swarm's operational service in the U.S. and globally and we encourage the Commission to act expeditiously to authorize Swarm to deliver its innovative connectivity services. Swarm's proposed constellation has the potential enable the critical telematics services mentioned above at low-costs and far more quickly than current satellite alternatives. We believe that Ford, through its work with Swarm, will be able continue its leadership position in the automotive market, supporting U.S. jobs and improving the safety and reliability of its vehicles in a manner that will improve the lives of every Ford customer around the globe.

Respectfully submitted,

Donald J. Lough
Assistant General Counsel, and
Secretary, Ford Smart Mobility LLC

Enclosures

cc: Commissioner Michael O'Rielly (michael.orielly@fcc.gov)
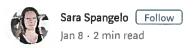   Commissioner Brendan Carr (brendan.carr@fcc.gov)
        Commissioner Jessica Rosenworcel (Jessica.rosenworcel@fcc.gov)
        Commissioner Geoffrey Starks (Geoffrey.starks@fcc.gov)
        Secretary Marlene H. Dortch (marlene.dortch@fcc.gov)

Swarm Technologies and Autonomic Team Up to Create Industry's First Low-Cost Ubiquitous Vehicle Connectivity Platform

Sara Spangelo [Follow]
Jan 8 · 2 min read

Swarm and Autonomic discuss the TMC at CES 2019.

When Ben and I founded Swarm, vehicle connectivity was one area we got very excited about. With more than one billion vehicles on the road and nearly one hundred million being added annually, we recognized endless possibilities to leverage vehicle data to improve the lives of the people who use them and the communities in which they move.

The challenge is that connectivity for transportation systems, particularly for vehicles, is currently limited to select portions of the world where cell service is available. As the world's lowest cost global comms network, we recognized the importance of partnering with others in the ecosystem who share a similar vision and that's where the team at Ford-owned Autonomic comes in.

Autonomic, creators of the world's foremost transportation and mobility platform for connected vehicles has built an unparalleled platform: the Transportation Mobility Cloud (TMC). The TMC connects the diverse components of mobility systems, including connected vehicles, mass transit, pedestrians, city infrastructure, and service providers—with the goal of orchestrating a safer, more efficient and sustainable transportation network.

The more broadly that TMC is available globally, the more value it can bring. That's why we are thrilled to announce that we are teaming up

with Autonomic to extend TMC's reach even further—anywhere a satellite can fly.

The net result will be nothing less than the world's first low-cost ubiquitous connectivity platform for connected vehicles. Together, we will enable enterprises to easily access critical telematics and emergency services anywhere on Earth by integrating Swarm's microsatellite network with the TMC.

In practical terms, without ubiquitous coverage, car sharing systems, for instance, are limited to urban areas, command and control systems are hampered and in-vehicle emergency services may not function. Our combined offering will allow access to a single global network solution of critical connectivity services—regardless of where a vehicle may travel.

Visit Swarm and Autonomic at the Ford Booth at CES 2019.

If you're at CES this week, we invite you to join us and Autonomic at the Ford Booth (LVCC, North Hall, #5002) to meet our team and learn more about the ways we will help shape the future of connected vehicles. Marcy Klevorn, President of Ford Mobility, announced part of our work with Autonomic earlier today. We're excited to share more soon on our efforts to build a connected future!

— **Sara**
CEO, Co-Founder
Swarm Technologies
@SwarmInternet

PS—please consider joining our community! Sign up for our newsletter here.

FORD'S FUTURE: EVOLVING TO BECOME MOST TRUSTED MOBILITY COMPANY, DESIGNING SMART VEHICLES FOR A SMART WORLD

Oct 3, 2017 | NEW YORK

- Ford initiates aggressive "fitness" push, re-basing revenue growth assumptions and attacking costs, while redesigning company operations for long-term success

- Capital will be allocated to regions, products and services with highest potential for growth and return; product shift calls for more trucks and SUVs, fewer passenger cars

- Ford is accelerating work on smart, connected vehicles, including AVs and EVs and digital services to thrive in emerging transportation operating system

NEW YORK, Oct. 3, 2017 – Ford Motor Company today is providing a strategic update to investors, detailing plans to leverage its unique product strengths, trusted brand and global scale to refocus and thrive in an evolving and disruptive period for the auto industry.

The investor presentation follows a four-month deep dive into Ford's strategy and business operations led by President and CEO Jim Hackett and Ford's senior leadership team. Hackett said Ford will improve its operational fitness, refocus capital allocation and accelerate the introduction of smart vehicles and services.

Ford president and CEO on May 22. "It's a belief that has always fueled our passion to create great cars and trucks. And today, it drives our commitment to become the world's most trusted mobility company, designing smart vehicles for a smart world that help people move more safely, confidently and freely."

The full slide deck of the presentation can be found here. Ford is reaffirming its 2017 full-year financial guidance and said its 2018 outlook will be provided in January.

Reiterating its long-term goal of an 8 percent automotive operating margin, Ford says it will embrace the profound technological changes and new competition buffeting the industry. To deliver, the company is expanding its scope to include vehicles and services – all designed around human-centered experiences. The company will tap its strengths integrating hardware and software in complex devices, its proven ability to deliver scale and the trust tied to the Ford brand.

Specifically, Ford is:

- **Accelerating the introduction of connected, smart vehicles and services customers want and value.** By 2019, 100 percent of Ford's new U.S. vehicles will be built with connectivity. The company has similarly aggressive plans for China and other markets, as 90 percent of Ford's new global vehicles will feature connectivity by 2020.

- **Rapidly improving fitness to lower costs, release capital and finance growth.** Ford is attacking costs, reducing automotive cost growth by 50 percent through 2022. As part of this, the company is targeting $10 billion in incremental material cost reductions. The team also is reducing engineering costs by $4 billion from planned levels over the next five years by increasing use of common parts across its full line of vehicles, reducing order complexity and building fewer prototypes.

- **Allocating capital where Ford can win the future.** This starts with the company reallocating $7 billion of capital from cars to SUVs and trucks, including the Ranger and EcoSport in North America and the all-new Bronco globally. Ford also has plans to build the next-generation Focus for North America in China, saving capital investment and ongoing costs. Further, Ford is reducing internal combustion engine capital expenditures by one-third and redeploying that capital into electrification – on top of the previously announced $4.5 billion investment.

- **Embracing partnerships.** Ford will continue to leverage partnerships, remain active in M&A and collaborate to accelerate R&D. The company recently announced it was exploring a strategic alliance with Mahindra Group as it transforms its business in India, and Zoyte with the intention of developing a new line of low-cost all-electric passenger vehicles in China. When it comes to autonomous vehicle development, the company recently announced a relationship with Lyft to work toward commercialization and a collaboration with Domino's Pizza to research the customer experience of delivery services.

- **Expanding electric vehicle revenue opportunities.** The company recently announced a dedicated electrification team within Ford, focused exclusively on creating an ecosystem of products and services for electric vehicles and the unique opportunities they provide. This builds on Ford's earlier commitment to deliver 13 new electric vehicles in the next five years, including F-150 Hybrid, Mustang Hybrid, Transit Custom plug-in hybrid, an autonomous vehicle hybrid, Ford Police Responder Hybrid Sedan, and a fully electric small SUV.

easy – culturally or operationally," Hackett said. "Ultimately, though, we must accept the virtues that brought us success over the past century are really no guarantee of future success."

Revamping product development, modernizing factories

At the same time, Ford is redesigning its operations to better compete in this disruptive era.

Hackett cites as a template the example of how the company reimagined the all-new 2015 F-150. Since then, the F-Series has gained market share and the average transaction price has increased 16 percent. It has improved fuel economy and increased capability for customers, thanks in part to a 700-pound weight reduction that helped make the F-150 the company's most positive contributor to CAFE standards for model year 2018. Additionally, 90 percent of the manufacturing equipment can be reused for the next-generation F-150, reducing future capital requirements. Finally, the innovation on aluminum and light weighting will pay off across a range of Ford trucks and SUVs.

Other priorities include:

- **Reducing orderable combinations of many nameplates, focusing on what customers value most.** Already the team has identified a ten-fold reduction of orderable combinations in the next-generation Escape and is moving from approximately 35,000 combinations in the current generation of Fusion to 96 in the next generation.

- **Rethinking product development processes and incorporating new technology.** In the next five years, Ford is aiming to reduce new vehicle development time by 20 percent, with new tools and fewer orderable combinations. Through the use of virtual assembly lines, the company has been able to reduce new model changeover time by 25 percent.

- **Redesigning the company's factories of the future.** Accelerating and scaling 3D printing, robotics, virtual reality tools and big data will improve logistics and enable a more efficient manufacturing footprint.

"We believe Ford will achieve its competitive advantage by focusing deeply on our customers – whether they're drivers, riders or cities – and that's where we are playing to win," Hackett said.

Risk Factors

Statements included or incorporated by reference herein may constitute "forward-looking statements" within the meaning of the Private Securities Litigation Reform Act of 1995. Forward-looking statements are based on expectations, forecasts, and assumptions by our management and involve a number of risks, uncertainties, and other factors that could cause actual results to differ materially from those stated, including, without limitation:

- Decline in industry sales volume, particularly in the United States, Europe, or China, due to financial crisis, recession, geopolitical events, or other factors;

- Lower-than-anticipated market acceptance of Ford's new or existing products or services, or failure to achieve expected growth;

- Market shift away from sales of larger, more profitable vehicles beyond Ford's current planning assumption, particularly in the United States;

- Continued or increased price competition resulting from industry excess capacity, currency fluctuations, or other factors;

- Adverse effects resulting from economic, geopolitical, protectionist trade policies, or other events;

- Work stoppages at Ford or supplier facilities or other limitations on production (whether as a result of labor disputes, natural or man-made disasters, tight credit markets or other financial distress, production constraints or difficulties, or other factors);

- Single-source supply of components or materials;

- Labor or other constraints on Ford's ability to maintain competitive cost structure;

- Substantial pension and other postretirement liabilities impairing liquidity or financial condition;

- Worse-than-assumed economic and demographic experience for pension and other postretirement benefit plans (e.g., discount rates or investment returns);

- Restriction on use of tax attributes from tax law "ownership change;"

- The discovery of defects in vehicles resulting in delays in new model launches, recall campaigns, or increased warranty costs;

- Increased safety, emissions, fuel economy, or other regulations resulting in higher costs, cash expenditures, and/or sales restrictions;

- Unusual or significant litigation, governmental investigations, or adverse publicity arising out of alleged defects in products, perceived environmental impacts, or otherwise;

- Adverse effects on results from a decrease in or cessation or claw back of government incentives related to investments;

- Cybersecurity risks to operational systems, security systems, or infrastructure owned by Ford, Ford Credit, or a third party vendor or supplier;

- Failure of financial institutions to fulfill commitments under committed credit and liquidity facilities;

- Inability of Ford Credit to access debt, securitization, or derivative markets around the world at competitive rates or in sufficient amounts, due to credit rating downgrades, market volatility, market disruption, regulatory requirements, or other factors;

- Higher-than-expected credit losses, lower-than-anticipated residual values, or higher-than-expected return volumes for leased vehicles;

- Increased competition from banks, financial institutions, or other third parties seeking to increase their share of financing Ford vehicles; and

- New or increased credit regulations, consumer or data protection regulations, or other regulations resulting in higher costs and/or additional financing restrictions.

We cannot be certain that any expectation, forecast, or assumption made in preparing forward-looking statements will prove accurate, or that any projection will be realized. It is to be expected that there may be differences between projected and actual results. Our forward-looking statements speak only as of the date of their initial issuance, and we do not undertake any obligation to update or revise publicly any forward-looking statement, whether as a result of new information, future events, or otherwise. For additional discussion, see "Item 1A. Risk Factors" in our Annual Report on Form 10-K for the year ended December 31, 2016, as updated by subsequent Quarterly Reports on Form 10-Q and Current Reports on Form 8-K.

About Ford Motor Company

Ford Motor Company is a global company based in Dearborn, Michigan. The company designs, manufactures, markets and services a full line of Ford cars, trucks, SUVs, electrified vehicles and Lincoln luxury vehicles,

worldwide. For more information regarding Ford, its products and Ford Motor Credit Company, please visit www.corporate.ford.com.

You build the connected-
vehicle killer app.
We build the platform that
lets you connect it.

The Transportation Mobility Cloud

The modern foundation for mobility applications

Electrification of vehicles. Autonomous vehicles. Ride hailing/sharing services. These, coupled with the consumers' desire to access transportation like they access Netflix and Amazon, are combining to create a gradual shift away from private car ownership, and toward solutions that demand a modern connectivity platform like the Autonomic Transportation Mobility Cloud (TMC).

- Provides bidirectional connectivity between vehicles and applications
- Securely ingests, normalizes and enriches vehicle data in real-time
- Gives developers secure and easy access to the processed data, be it telemetry, analytics, geolocation events or vehicle metadata, via APIs to support the rapid development of mobility services and applications
- Equips vehicle manufacturers to generate real revenue from the data locked inside their vehicles

Lets developers focus on developing

If you were building a phone app, you wouldn't reinvent iOS – you'd just let the real iOS do all the undifferentiated heavy lifting so you can focus your efforts on making your app brilliant. In the same way, the TMC takes over connectivity among participants in the mobility ecosystem so developers, automakers, and tech innovators can build brilliant transportation apps.

- Flexible and secure platform
- Comprehensive set of robust and developer-friendly APIs
- Supports routing self-driving cars, managing large-scale fleets, ride hailing, and many other applications

The Autonomic Architecture

Platform Components

Vehicle Connectivity

The platform receives raw vehicle data from multiple sources, archives them for redundancy, and converts the data into a standardized format used by the platform.

Data Processing

The platform processes and prepares the data to support a variety of applications. For example, fleet management metrics, such as hard acceleration and idling, are derived from the raw connected vehicle data ingested.

Application Integration

The platform provides APIs for developers to securely and easily access and leverage the processed data. These interfaces are secured using modern best practices and technologies and allow powerful applications to be built on top of the platform.

Command & Control

The platform is able to send instructions to vehicles remotely, such as turning the ignition on or managing an electric vehicle's charging schedule.

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AUTONOMIC

Remote Software and Configuration

The platform can be used to send configuration updates to connected vehicles over-the-air (i.e. wirelessly).

Infrastructure

Underneath all this, a robust infrastructure ensures reliable and secure operations at all times.

Example Applications

Our partners are building powerful applications on top of the Transportation Mobility Cloud.

Fleet Management

The platform allows fleet managers to unlock the power of connected vehicle data, including geolocation, vehicle health, driver behavior, and fuel consumption.

Transportation-as-a-Service

The platform supports Transportation-as-a-Service solutions, including services such as ride hailing and passenger-driver matching.

Autonomous Vehicles

Using the platform, autonomous vehicles can leverage Fleet Management and Transportation as a Service capabilities in order to orchestrate the optimized movement of people and goods.

Mobile Apps

Developers can use the platform to build connected vehicle mobile apps enabling a range of functionality including remote command & control actions such as EV charging.

Why Autonomic?

Connected Vehicle Cloud Leader

Ford has chosen Autonomic to power their commitment of 100% vehicle connectivity. The Transportation Mobility Cloud will soon be the largest connected vehicle cloud globally.

Diverse Transportation Partners

The platform is able to support multiple transportation partners, including different automakers. Autonomic is working with some of the largest transportation companies globally to build its vision of the Transportation Mobility Cloud. Partners include auto manufacturers, parts suppliers, fleet operators, and other companies working to disrupt today's mobility systems.

Robust, Reliable and Secure

Autonomic consistently follows best practices to ensure robust and reliable operations. The platform includes comprehensive and automated systems to

monitor each component, and is built to meet the most demanding security needs of connected mobility applications.

Scalable and Extensible

TMC is architected specifically with scalability and extensibility in mind. It process massive quantities of streamed data using the same technologies as LinkedIn, Netflix and other organizations that have critical real-time applications. Further, the platform uses a microservices architecture, a style of designing software as a suite of modular and independent services that are easier to scale, maintain and update compared to traditional approaches.

Competitive Pricing

TMC was designed from the beginning to be a far more economical alternative to a developer or automaker building their own non-differentiating platforms, infrastructure, communications methods, and partnerships necessary to succeed in the emerging connected world (and assuming the massive expense, time, and risk associated with doing so).

Learn more about us

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Commission

INTERNATIONAL BUREAU
FCC SELECTED APPLICATION LISTING BY FILE NUMBER
REPORT WR07 - Wed Mar 27 14:14:39 US/Eastern 2019

File Number = SATLOA2018122100094;

File Number: SAT-LOA-20181221-00094

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03/01/2019

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Action Taken PN Date:
03/08/2019

Streamlined: N/A

Term Begin Date: None

Environmental Impact: N

Term End Date: None

Status: Action Taken Public Notice

Date Filed: 12/21/2018

Red Light: N

Status Date: 03/08/2019

Last Action: None

Last Action Date: None

Grant Date: None

Bond Date: None

DA #: 19-164

Adopted Date: 03/07/2019

Released Date: 03/07/2019

Nature of Service: Mobile Satellite Service

Document Viewing

Other filings related to this application (Petitions, comments, etc)

Public Notice List

Licensee History

Attachment Menu

PDF Version of this application.

HTML version of this application.

Old File Number: None

Applicant:

Swarm Technologies, Inc.

845 Madonna Way

Los Altos, CA 94024- USA

Contact: Timothy Bransford

Morgan, Lewis & Bockius LLP

1111 Pennsylvania Avenue, NW

Washington, DC 20004 USA

Description: Swarm Technologies, Inc. requests authority to launch and operate a non-voice, non-geostationary mobile-satellite service system consisting of 150 satellites in low Earth orbit operating in the 137-138 MHz (space-to-Earth) and 148-149.95 MHz (Earth-to-spa

Pre-Defined Reports

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- Public Notice Search
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- IPF Current Authorizations by File Number
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