

2016 NAIAS - Toyota/Kymeta Collaboration - Shigeki Tomoyama, Dr. Nathan Kundtz

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Toyota/Kymeta Collaboration

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Dr. Nathan Kundtz, Kymeta Corporation Founder/CEO

Toyota Motor Corporation Senior Managing Officer Shigeki Tomoyama:

Good morning and thank you for coming.

I am very happy to be here today to announce Toyota's partnership with Kymeta, and to share the potential for vehicle satellite communications.

As many of you know, last week Toyota announced the framework for our next generation connected vehicles at the 2016 Consumer Electronics Show.

This framework uses vehicle data management to help make ever better cars.

In the coming years, we plan to increase vehicle connectivity in order to provide our customers with better services, such as updating 3D map data and software and various infotainment options.

Obviously, this framework would work very well with a secure, high bandwidth communications system with a global coverage area.

Toyota has investigated satellite technology for many years. It offers several important benefits for vehicle communications.

First, satellite has a global and stable coverage area.

Second, it can transmit huge amounts of data.

Third, it can provide stable communications in case of an emergency or natural disaster.

Of course, for automotive use, satellite has challenges as well. Most important, it is very difficult to fit a large bowl-shaped antennae onto the car.

That is why Toyota is so excited about Kymeta.

For several years, Toyota met with emerging companies around the world to investigate new technologies.

We were very excited to learn about Kymeta, because their flat antennae technology could solve the challenge of vehicle-based satellite communications.

Since September 2013, Toyota and Kymeta have conducted joint research on flat antennae's for use in cars.

Today, I am happy to announce that we have entered into an agreement giving Toyota exclusive right to the development and testing of the on-car antenna.

In addition, Mirai Creation Investment Limited Partnership, a fund where Toyota participates as an investor, has invested \$5 million in Kymeta to enhance future technology research and development.

There is still much work to be done, and our project is still in the research stage.

However, I hope you can see how exciting this new technology is, and what it could mean for the future of connected vehicles.

Thank you.

Kymeta Founder Dr. Nathan Kundtz:

Thank you, Tomoyama-san.

And thanks to Toyota for teaming up with us to create a new age of automotive technology: the truly connected car.

I'm the founder of Kymeta Corporation.

And our goal is to revolutionize the way you and your vehicle communicate globally...securely...and inexpensively.

First ... a short background on Kymeta.

We opened our doors in 2012 in Redmond, Washington ... and have been making incredible leaps in satellite communications technology for the past four years.

One of those leaps was the redefinition of the satellite antenna...from a single piece of hardware ...to one that is smart... and uses software to scan and send signals *only* in the direction you want.

Through research in the field of metamaterials ...we found that we could create an antenna that was ... lighter and smaller...lower-in-profile and more versatile... than any satellite antennae that ever existed.

By aiming precisely ...we can create powerful connections with high-capacity satellites... that have historically required a "dish."

To establish a mobile connection, a conventional dish requires motors ...is quite heavy...and impractical for use on a mobile consumer product like ... say ... a car.

The Kymeta antenna has no moving parts ...and uses software to track satellites that move across the horizon.

So what problem does this solve?

Twenty years ago if you emailed your friend a selfie taken with today's typical smartphone ... it would have taken 40 minutes to upload.

Today ... that same picture uploads in ONE SECOND.

And for those that have to have the best ... you can find service... *for the home* that's even 100 times faster.

Of course we can attain such speeds because the home is in a fixed place ... connected by wires and fiber optic cables.

Our challenge is that we're talking about connecting a *car*; a 70 mile per hour moving target.

It's obvious you can't connect it with wires.

More importantly...the wireless spectrum that is available today ...will—simply—not meet the escalating demand to move bigger and bigger data.

We ... and Toyota ...have agreed to pursue a technology that will provide uninterrupted data delivery that is

comparable to ... or exceeds the speed ... of data delivered to your home today.

This is possible because of a particular natural resource which is highly limited on the ground ...but widely available by satellite.

That resource is called... *spectrum*.

Massive amounts of data can be delivered with this spectrum.

That's why it is used to offer HD-television services with hundreds of channels.

But until now you would have needed to mount a large dish to the roof of your car to gain access.

If you believe data consumption will continue to climb; if you believe the car will follow the same data consumption trend as the home; the most logical path of access is from space.

Unlimited, inexpensive data from space.

Without wires.

Without cell towers.

Without **poor coverage areas**.

Coverage areas.

Our partner has a clear commitment to its global customers: be they in Detroit, Tokyo...or sub-Saharan Africa.

Whether they are delivering movies or critical software updates...they believe that every one of their customers should have access to those services.

We believe that any connectivity solution that leaves 4 billion people in the world disconnected ... isn't a solution at all.

The security of the connection to the car is crucial.

Governments use satellite connectivity for their most secure transmissions.

Signal security stems from the point-to-point architecture of the transmission.

Without going too deeply into the math...it is estimated that there are a hundred-million fewer points of entry into a typical satellite feed than a typical cellular data network.

And ... if there is a security breach ... the point of attack can be quickly discovered and patched.

The fix can then be quickly broadcast to the affected vehicles.

Think of how you live today: your car connects with a very thin thread of data.

Despite this ... cars *today* typically have more than 100 computing processors...working in concert.

Tomorrow ... the data pipe will need to be significantly bigger.

The Kymeta antenna will be designed to deliver that volume on an unprecedented scale.

Look around the show floor here today and you'll see a lot about autonomous cars.

If you were at the Consumer Electronics Show in Vegas last week...it would be even more obvious.

The telemetry data, hi-res maps and software that enable higher and higher levels of automated driver-assist will be a necessary part of the **equation**.

Kymeta technology will be designed to deliver a terabyte per month of data into that **equation**.

That's over one-hundred times what a typical monthly cell plan gives you today.

So what kind of data will tomorrow's car need?

Software and firmware.

Over-the-air updates.

Telematics.

High definition and 3D mapping.

And of course ...infotainment.

High density weather maps will warn drivers to pull over to avoid a flash flood half-a-mile up the road.

Kids will have on-demand gaming in back ...while parents are notified of the best price on gas in a five-mile radius.

Kymeta and Toyota are prepared for this future.

Again ... I'd like to thank Toyota for having the vision to future-proof their connectivity solution ...by partnering with Kymeta Corporation to tackle the exciting times ahead.

I would also like to introduce our partner ...and the world's largest holder of wireless spectrum, Intelsat.

With 50 satellites, the size of a bus, in their existing fleet ...and counting...this is NOT some network that will be ready in 2025.

This is the network of NOW.

Thank you all for joining us today.

