Digital Paper for Smart License Plates

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The blockbuster 1980s *Back to the Future* film series features one of the most iconic cars in movie history—a gull-winged DeLorean time machine driven by the Doc Brown character.

While the car was a marvel of futuristic sci-fi technology, its original California license plate (OUTATIME) was decidedly old fashioned—the same type of stamped metal plate that hasn't changed in over a hundred years. But when Doc returns from 2015, the DeLorean sports a barcode license plate.[1] The film's writers figured that in the future, surely the humble license plate would provide a more modern means of automotive registration.

Not only were the film's writers correctly prescient, but it also turns out that their 2015 time frame was not far off from reality. In 2009, Reviver™ was founded. California-based Reviver launched with a vision for digitizing license plates and completely disrupting the staid world of automotive compliance. The company received its first major round of financing in 2016, just one year off from the date of Doc's return.

Incorporating a 2400 x 1034 UHD E Ink® digital paper display, Reviver's Rplate™ transforms traditional license plates. The new platform removes headaches for drivers while streamlining efficiency and lowering costs for state-run Departments of Motor Vehicles (DMVs).

The digital license plate: The newest innovation in the ongoing digitalization of the automobile.

The first license plates were issued in 1903, several years before the launch of the Ford Model T, the car that more than any other helped popularize automotive travel in the United States. License plates were made the same way then as they are now, by stamping numbers and letters onto sheet metal. The only technologic detour from metal plates was during World War II, when manufacturers were forced to make plates using soybean-based fiberboard to preserve scarce metal for tanks and planes (unfortunately, goats discovered the metal substitute made for a nice snack, complicating wartime efforts).[2]

Photo courtesy Reviver.

Reviver's digital Rplate is part of an integrated platform that lets drivers update their registration with a smart phone app.

Automobile technology has continuously advanced, with electronics and digitalization making the driving experience progressively easier and safer. Today's vehicles are packed with electronics, from anti-lock braking systems and stability control programs, to lane assist systems and blind spot detection. In 1950, the cost of electronic systems in cars represented about 1% of their value.[3] Today, electronics account for 40 percent of the cost of a new car.[4]

The current compliance system is badly in need of a makeover. The old analog paradigm requires vehicle owners to get their plates at the DMV (or have a car dealer get them), affix plates to their car and stick on the registration tag. Savvy drivers will also score their tag with a razor to make it harder for thieves to peel them off. When it's time to renew, vehicle owners go the DMV again, or renew online and have tags mailed to them. Given that the average wait time at a DMV is 40 minutes,[5] it's no wonder the sentence "I went to the DMV and had a great time" is not part of our common vernacular. This drain on productivity is especially problematic for fleet owners. Hertz's U.S. car rental business has nearly 535,000 vehicles in its fleet. Manually changing plates and renewing registrations translates into more man-hours and higher costs.

Reviver's Rplate removes these headaches. The company's platform integrates seamlessly with motor vehicle administration (MVA) information systems and allows drivers or fleet operators to update registrations in seconds using a smart phone app. In the age of COVID, not having to visit a DMV provides one more way to safeguard health.

Drivers can purchase the baseline Rplate or upgrade to the Rplate Pro™ model, which offers advanced telematics for tracking, controlling and recording driving behaviors. While the Rplate Pro is most attractive to fleet operators, parents of teenage drivers also find comfort in knowing exactly where their car actually is and how it's being driven at any given moment.

The license plate as communications portal.

The Rplate can be thought of as a mobile and connected digital screen that also serves as a license plate. "You start thinking about the plate as more than just a license plate," says Neville Boston, Reviver's founder and Chief Strategy Officer. "It's a compliance tool, but also a way for people to communicate important information about the health and safety of the vehicle and its occupants." If a vehicle is reported stolen, the Rplate can display the word STOLEN, making it a lot easier for police to quickly make an arrest and recover the vehicle. Amber or Silver emergency alerts can also be displayed.

Photo courtesy Reviver.

If a car is reported stolen, the Rplate lets everyone know it.

In addition to enhancing vehicle security and passenger safety, the Rplate provides a means of creative expression. Reviver offers more than 400 DMV-approved messages that can appear on their Rplate, and drivers can apply to their local DMV through Reviver to get approval for their own unique messages. The current approved list includes everything from "Support Our Troops" to "I'd Rather Be Playing Badminton." Reviver is also finding a receptive market for affinity license plates that allow organizations such as sports teams to display their logo or slogan.

Photo courtesy Reviver

Rplates let drivers choose from hundreds of approved messages to display on their plate, or apply to have their own unique message approved.

A range of unique digital paper properties led Reviver to E Ink.

E Ink's digital paper, also known as ePaper, was broadly adopted for use in eReader devices such as the Kindle. Today, digital paper technology has literally grown up, with a range of size formats used in numerous applications across many industries.

Digital paper is comprised of particles within microcapsules or microcups that are coated onto a thin film layer and act as a form of ink. Instead of ink being pressed permanently upon paper, the ink particles are automatically recycled to form new letters and images when the display image is updated. Power is only consumed when an electrical charge rearranges the particles to form a new image—a key attribute that made digital paper the only viable solution for Reviver's Rplates. In fact, E Ink displays require approximately 99 percent less power than other types of digital screens such as LCD. The base model Rplate runs off a small lithium-ion battery that lasts about five years. The Rplate Pro, which requires additional power to operate its GPS and advanced telematics, is connected to a car's battery. But in either case, the power requirement is extremely low.

Another important E Ink feature is the crisp, easy-to-read display image. State law requires that a license plate must be readable by law enforcement from a distance of 75 feet. E Ink's screen meets or exceeds this standard, providing the same readability as a stamped metal plate. While the screen is reflective for easy reading in daylight, it is also highly visible at night and in the case of the Rplate Pro, a front light provides extra illumination during nighttime operation.

E Ink displays are also highly durable. They can operate long-term within a temperature range of minus 40 to 185 degrees Fahrenheit. The displays can take a beating. Complete with a proprietary Reviver reinforced casing, Rplates routinely display readable information even after being smashed in collisions.

Driving into the future, one state at a time.

Reviver's successful rollout in California and Arizona is now extending to more states. Michigan, Illinois, Texas, Pennsylvania, Maryland, and Georgia, along with several other large states, are in various stages of testing and adoption, with many more to come. Reviver foresees a tipping point soon where OEMs will simply incorporate Rplates into their manufacturing to make integration even easier for car buyers. With broader adoption will come more features, with automatic toll and parking payment on the near-term horizon.

Where is all this headed? In many ways, Reviver is emblematic of the future of the automobile. Anything that can become digital, will become digital. Autonomous fleets of vans will provide consumers with subscription services, making car ownership—and the American garage—less common. Cities will become smarter, with driverless cars interconnected to better control traffic flow and conserve energy. Electric vehicles (EVs) will be the norm, not the exception. In this changed world, schlepping to the DMV to renew a plate will become a relic of the past.

But nobody is waiting for the future to get an Rplate. Consumers already recognize that having a digital license plate is really cool. Whether an Rplate is attached to a 2015 Toyota or the latest Tesla, the result is a more attractive and modern-looking vehicle. Or, as Doc says to Marty in *Back to the Future*, "If you're going to build a time machine into a car, why not do it with style?"

About the Author

Ted Page is a Co-Founder and Principal of Captains of Industry. Page has created content and marketing for a wide range of global companies including Apple, Microsoft and Starbucks.

About the Sponsor

E Ink is the originator, pioneer and commercial leader in digital paper technology. The company delivers its advanced display products to the world's most influential brands and manufacturers, enabling them to install extremely durable, low-power displays in previously impossible or unimaginable applications and environments.

E Ink encompasses the combined E Ink Corporation, which was spun out of the MIT Media Lab in 1997 to commercialize electronic ink and EPD technology, and Prime View International, which was established in 1992 as the first TFT LCD company in Taiwan, focusing on high-quality small-to-medium-sized TFT LCDs. In 2009, Prime View acquired E Ink Corporation to further integrate and expand the EPD supply chain and the new combined companies were branded as E Ink.

E Ink's corporate philosophy centers around delivering revolutionary products, excellent user experiences, and environmental benefits through advanced technology development.

Sources:

1. Wikipedia

2. History Channel

3. Wikipedia

4. Car and Driver

5. Enterprise