CHARTLINE

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INVESTOR VIEWPOINT

INTELLIGENT TRANSPORTATION SYSTEMS

IN BRIEF

Structural congestion will drive increased demand for companies using sensors and operational intelligence platforms to manage traffic.

COMPANIES TO WATCH

- CyPhy Works
- Image Sensing Systems
- Inrix
- Esri, Inc.
- Siemens
- Trimble Navigation Ltd.
- DENSO
- Delphi
- Qualcomm
- Commsignia

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ABOUT US

Chartline Capital Partners is a special situations venture capital firm investing at the intersection of large corporates and venture-stage technology companies. We buy shares in both primary and secondary offerings and are actively investing from dedicated funds capitalized by family offices and private foundations. We focus on a select number of investment themes around which we manage our portfolio.

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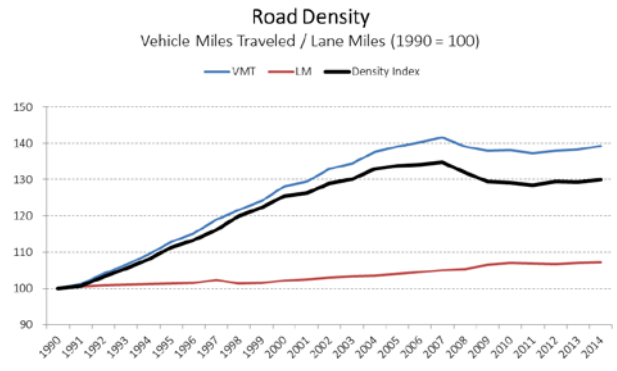
CONGESTION RELIEF

By Nathaniel Becker Chase, Rebecca Leisher

The U.S. has a growing traffic problem. It is a problem that will worsen, despite advances of telecommuting, on-demand car services, and increasingly automated car technology. In the past few years, US consumers have been buying more cars, encouraged by cheap loans, low gas prices, and deferred demand. Traffic also increases with GDP, so expect more driver miles as our recovery extends. But we have not been building more roads in equal manner. Hence, the issue: structurally increasing congestion.

Travel density – measured by miles driven over available lane-miles (see Fig. 1) – is more than 130% of where we were in 1990. After a brief respite for the recession, we are starting to see the trend back up. We have only added 7% more lane-miles in the past two decades and never more than 1.1% p.a (in 2009). Given pressure on public spending, it is unlikely we will see more road anytime soon.

FIGURE 1



Source: US Dept. of Transportation; Chartline analysis

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Of course, we waste real money here. INRIX, a traffic technology company, estimates that in 2013 the US lost about $120B to traffic in lost productivity and fuel. By comparison, this was about 1.5x the total US expenditure for highway and street construction in the same year, and 4x total US spending for public transportation. And things are getting worse. INRIX found congestion in the US worsened by over 15% in 2013 alone. Waste is projected to increase +50% through 2030 to $180B in real terms – which might be optimistic (given a 2.4% CAGR).

FIGURE 2

Country	National Cost (2030, Annual $B)	Per Household (2030, $USD)
US	$ 186	$ 2,301
Germany	$ 44	$ 2,927
UK	$ 33	$ 3,217
France	$ 30	$ 3,163

Source: Inrix (October 2014)

From an investor perspective, this is great news. Technology companies that help smooth and manage the flow of traffic are in for a great ride over the next 3-5 years. We have spotted a few worth watching. One area we like is sensor platforms that work in unstructured environments (think license plate readers). Another is "just in time repair" for the roads, bridges, and tunnels that we have today. Consumer apps (e.g. Waze), driverless cars (thank you Google) will undoubtedly have an impact; we just think those areas lack opportunities for more value-oriented investors like us. Components in the stack like LiDAR or V2X software solutions (e.g. Marben, Commsignia) provide more interesting and varied hunting grounds.

Our driverless future is still worth tracking given the bold aspirations for efficacy, system capacity, and safety. In regards to the increasing automation of and intercommunication between cars, all major car manufacturers, (especially GM and Mercedes) have joined Google in discovering and producing vehicle-to-vehicle, vehicle-to-infrastructure, and other "Dedicated Short-Range Communication Devices" that help smooth and manage the flow of traffic. The 2017 Cadillac will rely on such technologies to drive itself on highways and Mercedes-Benz already has a system in place to allow the driver to relax in bumper-to-bumper traffic. Automated vehicles, while not yet for sale, are currently street-legal in Nevada, Florida, California, and Michigan. While the technology will be ready sooner (e.g. significantly more safe than humans), we can expect 7-10 years of transition period before the efficiencies of automated driving have a material impact on traffic efficiency (e.g. >20% improvement in throughput).

In the meantime, congestion will only get worse. Fortunately, the buyers of traffic solutions might be a more diverse crowd than you think. Governments and municipalities are naturally the core of this market, served mainly by large system integrators like IBM, Thales, and Huawei who could be natural acquirers. But increasing penetration of private infrastructure companies is here and growing. In most cases, they will have an interest in smooth operations and happy customers. Look to private infrastructure owners like Meridiam or engineering firms like AECOM to be interested in how newly commercialized technologies can improve system performance.

Years in the Making

Technology in this space is benefiting from years of enabling developments. For example, back in 2009, NIST ran a challenge grant that picked 20 companies to accelerate materials and monitoring technologies. At the sensor edge, camera technologies – helped by the surge of automation and robotics breakthroughs – are increasingly able to handle large throughputs. The communication networks – from low-power RFID in the field to satellite backhaul – are now quite reliable. And the data processing capacity, served up in modular, scalable units from a maturing data center industry is online and available for use.

The real question for both companies and their investors is how you go to market. Many firms have taken to selling hardware. One maker of traffic cameras, Image Sensing Systems, is a good example of how a company with intriguing potential has met with the lumpiness of large capex. If they found a way to move more customers over to the licensing/subscription model they might unlock significant value.

Just-in-time repair and replacement is also a space to watch. One company, CyPhy Works (Waltham, MA), is on the prowl with tethered UAVs that provide mobile and persistent surveillance combined with high-definition cameras and a secure communication link. The company was one of the winners of the 2009 NIST challenge grant and is led by Helen Greiner, co-founder and former president of iRobot. Other companies like RedZone Robotics (pipe monitoring and repair) may also find ways to bring their technology platform into the roads and tunnels business.

DENSO, one of the world's foremost suppliers in advanced automotive technology, systems, and components, is a leader in the latest vehicle-to-vehicle

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and vehicle-to-infrastructure (V2X) safety technology to allow cars to "talk" or communicate with other surrounding vehicles and traffic signals. Delphi is working closely with GM to improve their automated control technology and Qualcomm is experimenting with the versatility and functionality of already created smart-phone chips in smart-cars.

Looking Out

Against this backdrop, we think the most interesting companies will have three things in common. First, they will have zeroed in on a persistently inefficient part of the system mainly addressed by manual solutions or none at all. Second, they will have found a way to capture the benefit of years of prior research and supporting technologies without paying for it. Third, they will go to market primarily with a technology-driven services approach constantly refreshed by a significant and rapidly iterative R&D program. They won't be selling hardware (cars or cameras); they will be selling the solution.

While developed countries with recovering GDPs and constricted road budgets are the primary markets for such firms, emerging economies are worth a look too. Rapid population growth combined with natural resource wealth is a favorable backdrop. Brazil, Indonesia, and China are ripe for further expansion by ambitious startups or larger strategic buyers who acquire them.

Of course, avoidance is always a viable option. Improving congestion – like its cousin, building energy efficiency – can sensibly viewed as a "peak shaving" problem. Timed dispatch, ride-sharing, dynamic routing, and even employer scheduling can all help spread peak demand for roadways into the more quiet moments of the day. Our view on this is similar to power: humans are really bad at behavior change. There will certainly be good solutions here that help incrementally; but we are willing to bet people will continue jamming themselves into the morning and evening commute.

We welcome the opportunity to continue the conversation with companies, investors, or stakeholders who share our interest in the challenges and opportunities of battling congestion.

Please be in touch. ■