Scaling Traffic: People Pod Pool of On Demand Self Driving Robotic Cars who Automatically Refuel from Cheap Solar

Thursday, July 16, 2009 at 11:10AM

Todd Hoff in traffic

Update 17: Are Wireless Road Trains the Cure for Traffic Congestion? BY ADDY DUGDALE. *The concept of road trains--up to eight vehicles zooming down the road together--has long been considered a faster, safer, and greener way of traveling long distances by car*

Update 16: The first electric vehicle in the country powered completely by ultracapacitors. The minibus can be fully recharged in fifteen minutes, unlike battery vehicles, which typically takes hours to recharge.

Update 15: How to Make UAVs Fully Autonomous. The Sense-and-Avoid system uses a four-megapixel camera on a pan tilt to detect obstacles from the ground. It puts red boxes around planes and birds, and blue boxes around movement that it determines is not an obstacle (e.g., dust on the lens).
Update 14: ATNMBL is a concept vehicle for 2040 that represents the end of driving and an alternative approach to car design. Upon entering ATNMBL, you are presented with a simple question: "Where can I take you?" There is no steering wheel, brake pedal or driver's seat. ATNMBL drives for you. Electric powered plus solar assist, with wrap-around seating for seven, ATNMBL offers living and/or working comfort, views, conversations, entertainment, and social connectedness.
Update 13: The Next Node on the Net? Your Car!. A new radio system developed in Australia is transforming the vehicles on the street into nodes on a network.
Update 12: United Arab Emirates building network of driverless electric taxis. *When the system's fully built, planners say the podcars will be able to deliver riders within 100 meters of any location in the city. The whole network of tracks for the cars will be two stories beneath street level.*


Update 11: Self-driving cars set to cut fuel consumption. Large-scale test seeks to put humans in the back seat. *NEDO says it will start testing several key technologies that allow for autonomous driving between 2010 and 2012.*
Update 10: Fighting Traffic Jams With Data. *Researchers from different universities are working on ways for cars to better communicate with each other and relay crucial driver information such as traffic speed, weather and road conditions.*

Update 9: Accident Ahead? New Software Will Enable Cars To Make Coordinated Avoidance Maneuvers. *In dangerous situations, the cars can independently perform coordinated maneuvers without their drivers having to intervene. In this way, they can quickly and safely avoid one another.*
Update 8: Great article in Wired on Better Place's proposal for a new electric car distribution system. The idea is to blanket the country with "smart" charge spots. You buy your car from them and purchase a recharge plan. Profit come from selling electricity.
Update 7: Capturing solar energy from asphalt pavements. An interesting way to make the system self-sufficient.
Update 6: Why We Drive the Way We Do Unlocks How to Unclog Traffic. Vanderbilt says: The fundamental problem is that you've got drivers who make user-optimal rather than system-optimal decisions. Josh McHugh replies: Make the packets (cars) dumb and able to take marching orders from traffic routing nodes.
Update 5: Traffic jams are not caused by flaws in road design but by flaws in human nature. Nearly 80 percent of crashes involve drivers not paying attention for up to three seconds. The both good and scary thing about computers is they always pay attention.
Update 4: Volvo Says It Will Have An Injury Proof Car By 2020.
Update 3: Map Reading For Dummies. *Europe (again) is developing a system that will read satellite navigation maps and warn the driver of upcoming hazards – sharp bends, dips and accident black spots – which may be invisible to the driver. Even better, the system can update the geographic database. Another key capability of the People Pod system.*
Update 2: Road Safety: The Uncrashable Car?. *A European research project basic could lead to a car that is virtually uncrashable. An uncrashable car would definitely ease people's concerns over computerized navigation.*
Update: Shockwave traffic jam recreated for first time - *"Pinpointing the causes of shockwave jams is an exercise in psychology more than anything else. 'If they had set up an experiment with robots driving in a perfect circle, flow breakdown would not have occurred. Human error is needed to cause the fluctuations in behaviour.'"*

Traffic in the San Francisco Bay area is like Dolly Parton, 10 pounds in a 5 pound sack. Mass transit has been our unseen traffic woe savior for a while. But the ring of political fire circling the bay has prevented any meaningful region wide transportation solution. As everyone scrambles to live anywhere they can afford, we really need a region wide solution rather than the local fixes that can never go quite far enough. The solution: create a **People Pod Pool of On Demand Self Driving Robotic Cars who Automatically Refuel from Cheap Solar**.

Commuters are Satisfied Not Carpooling

You might think we would car pool more. But people of the bay don't like carpools and they don't much like mass transit either. In the Metro, a local weekly, they published a wonderful article Fueling the Fire, on how we need to cure our car addiction using the same marginalization techniques used to "stop" smoking.

A telling quote shows how difficult going cold turkey off our cars will be:

Mitch Baer, a public policy and environment graduate student at George Mason University in Virginia, recently surveyed more than 2,000 commuters in the Washington, D.C., area. He found that people who

drove to work alone were more emotionally satisfied with their commute than those who rode public transportation or carpooled with others.

Even stuck in traffic jams, those commuters said they felt they had more control over their arrival and departure times as well as commuting route, radio stations and air conditioning levels.

Commuters said that driving alone was both quicker and more affordable, according to the study.

"They will have a tougher time moving people out of their cars," Baer said. "It's easier for most people to drive than take mass transit."

The key phrase to me is: *people who drove to work alone were more emotionally satisfied*. How can people jostled in the great pinball machine that are our roadways be emotionally satisfied? That's crazy talk. Shouldn't we feel less satisfied?

In Our Cars We Feel Good Because We Are in Control

Solving the mystery of why we feel satisfied while stuck in traffic turns on an important psychological clue: **the more we perceive ourselves in control of a situation the less stress we feel**. Robert Sapolsky talks about this surprising insight into human nature in Why Zebras Don't Get Ulcers.

Notice we simply need more "perceived" control. Take control of a situation in your mind and stress goes down. You don't actually need to be in more control of a situation to feel less stress. If you have diabetes, facing your possibly bleak future can be less stressful if you try to control your blood sugars. If you are a speed demon, buying a radar detector can make you feel more in control and less stressed as you zoom along the seldom empty highways. If you are bullied, figuring out ways to avoid your torturer puts you more in control and therefor less stressed.

Figure out a way to control and an out of control situation and you'll feel happier. That's what I think we are accomplishing by driving alone in cars. In our car we have complete control. Cars are our castles with a 2 inch air moat cushion. Most cars are plusher than any room in your average house. Fine leather, a rad sound system, perfect temperature control, and a nice beverage of choice within easy reaching distance. In our cars we've created a second womb. The result is we feel more control, less stress, and more satisfaction, even when outside, across the moat, a tempestuous sea of stressors await.

Our Mass Transit System Must Supply Perceived Control

Given the warm inner glow we feel from being wrapped in the cold steel of our cars, if you want people to get out of their cars and onto mass transit you must provide the same level of perceived control. None of our mass transit options do that now. Buses are on fixed schedules that don't go where I want to go when I want to go. Neither do trains, BART, or light rail. So the car it is. Unless a system could be devised that provided the benefits of mass transit plus the pleasing characteristics of control our cars give us.

With Recent Technological Advances We Can Create a New Type of Mass Transit System

New technologies are being developed the will allow us to create a mass transit system that matches our

psychological and physical needs. Just berating people and telling them they should take mass transit to save the planet won't work. The pain is too near and the benefits are too far for the mental cost-benefit calculation to go the way of mass transit.

The technologies I am talking about are:

- Inexpensive solar with $1/watt solar panels. Our mass transit must of course be green and cost effective.
- Breakthrough battery could boost electric cars. Toshiba promises 'energy solution' with nearly full recharge in 5 minutes.
- Personal transportation pods. A reusable vehicle that can take anyone anywhere they want to go.
- Self driving vehicles. We are making great strides in creating robot cars that can drive themselves in traffic. Already they drive better than most humans can drive (low bar, I know).

Mix these all together and you get a completely different type of mass transit system. A mashup, if you will.

Create a People Pod Pool of On Demand Autonomous Self Driving Robotic Cars that Automatically Refuel from Cheap Solar

Many company campuses offer a pool of bicycles so workers can ride between buildings and make short trips. Some cities even make bikes available to their citizens. The idea is to do the same for cars, but with a twist or two.

The cars (people pods) can be stored close to demand points and you can call for one anytime you wish. The cars are self driving. You don't actually drive them and are free to work or play during transit. Different kinds would be available depending on your purpose. Just one person on a shopping trip would receive a different car than a family. The pods would autonomously search out and find energy sources as needed to recharge.There's no reason to assume a centralized charging and storage facility. When repair was needed they could drive themselves to a repair depot or wait for the people pod ambulance service.

The advantages of such a system are:

- **Perceived control**. You have a personal "car" you control the destination for, the interior environment of, and your own actions inside. This gets over the biggest hurdle with current mass transit options.
- **Better regional traffic flow**. The autonomous cars could drive cooperatively to smooth out traffic jams. Traffic jams are largely caused by people speeding up and slowing down which causes ripples of slowness up and down the road. And automated system could prevent that.
- **Go where you want to go**. It would be used because people can go to exactly where they need to go and be picked up exactly where they need to leave from at exactly the time they wish. None of these are characteristic of current systems.
- **Leverage existing road ways**. Creating light rail and trains is expensive and wasteful (except for the high speed point-point variety). They don't extend to where people live and they don't go where people go. So it creates a multi-hop mess out of every trip. We already have an expansive road system that goes where everyone wants to go. Using the road infrastructure more efficiently makes a lot more sense than creating hugely expensive partial solutions. And since these cars would be eco-friendly, most arguments against using cars fall away.
- **Cheaper delivery**. One force keeping truly distributed manufacturing and retailing from blossoming is

high delivery costs. A $2 item is simply too expensive to buy remotely and ship because shipping costs more than the product. An automated transportation system would make this model more affordable.

- **Live where you want to live**. Most mass transit systems are based on trying to socially reengineer our current suburbian and exurbian living pattern into a high density live-work pattern. While this should be an option, most mass transit proposals assume this pattern as a given and can't deal with current realities. For the foreseeable future people will not give up their houses or their lifestyles. The People Pod approach solves the mass transit problem and the "difficulties" of having to change a whole populace to behave in a completely different way for less than compelling reasons.
- **Still can own your own car**. This isn't a replacement for the current car culture. It's leveraging the car culture. You can still own and drive your own car. Nobody is trying to steal your car away from you.
- **Cleaner and safer**. Mass transit is disliked by many because it is perceived as dirty and unsafe. The pods would be safe and clean.
- **Road safety**. Our new robot overloads will make our lives safer. Hopefully, possibly, maybe...

Funding

- **Current transportation budgets**. Money could be redeployed from existing less than successful approaches.
- **Advertising**. The outside of vehicles could contain advertising as could the inside, especially from the internal search system. Imagine wanting a new place to eat and asking the pod to suggest one. That's prime targeted marketing. Social networks and massive multi-player games could also be created between pods.
- **In-flight services**. Movies on demand and so on.
- **Efficiencies**. The plug-in cars are electric and efficient and low maintenance. That will save money.
- **Up sells**. Individuals could buy their own pods and trick them out. Also, people could pay for a higher class of pod from the pod pool.

- **Licensing**. Technology used in making the pods could be sold to other manufacturers. Create a standardized market so competition and cooperation can erupt.
- **Sponsorship**. Companies could buy rights to play music, stock the food locker, use their equipment, etc.
- **Naming rights**. The rights to name parts of the system could be sold.

Implementation

- **Challenge prize**. Maybe someone with a vision and a dream can put up a $50 million prize to get it going. Something like the Xprize.
- **Government funding**. Don't laugh, it might happen.
- **Startup**. I'm available if interested :-) With a large enough challenge prize this is a viable model.

It's a Usable System so People Would Use It

After a lot of reading on the topic and a lot of self-examination on why I am such a horrible person that I don't use mass transit more, this is the type of system I could really see myself using. It doesn't try to change the world, it uses what we got, and gives people what they want. It just might work.

Update on Thursday, November 11, 2010 at 10:36AM by Todd Hoff

Robert Scoble with a cool interview on the future of driving without traffic jams: Stanford Automotive, part II: The future of autonomous cars

Sokolsky estimates that many of the features that Junior employs, like cameras monitoring lanes and blind spot detection, will start becoming standard over the next ten years. But he also thinks that people will have to adapt, at least as much as the cars. "In some ways I think the technology is going to come along much faster than both the legal issues and societal acceptance," says Sokolsky. "Because you're going to have to convince people to give up driving their car everywhere, and some people are going to be extremely reluctant to do that. In this field, we sort of lose sight of this, but we talk to people, and they say, 'That sounds terrifying.' There's a lot to overcome in terms of that."
